Linking Tobacco Control Research and Practice

for a Healthier California Conference

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For more information please visit:
http://www.cce.csus.edu/conferences/cdph/ltcrphc11/indexMain.htm

General Information

The California Tobacco Control Program (CTCP) and the Tobacco-Related Disease Research Program (TRDRP) invite you to participate in a new and stimulating joint conference experience: **Linking Tobacco Control Research and Practice for a Healthier California.** It will be held April 10 – 12, 2012 at the Hyatt Regency Sacramento. This conference is the first of its kind where CTCP and TRDRP will integrate the CTCP Project Directors' Meeting with the TRDRP Investigators' Meeting into one event.

This promises to be a very valuable experience for tobacco control advocates and researchers throughout the state. The first day will be science-focused, the second day will combine scientific and tobacco control program presentations, and the last day will be program-focused. Conference highlights include:

- Program implementation and research initiatives to support implementation of the new Family Smoking Prevention and Tobacco Control Act;
- Introduction of two new CTCP campaigns on tobacco waste and the tobacco retail environment;
- Presentation of the CTCP Carol Russell and TRDRP Cornelius Hopper Awards;
- Informative tobacco control science and program poster and workshop sessions; and
- Skills-based training workshops.

All tobacco control advocates and researchers, including tobacco control advisory group members and programs funded by Proposition 99 (TRDRP, CTCP, and California Department of Education) should plan to attend.

Note: All CTCP-funded agencies are required to send at least one representative to Days 2 and 3 of the Conference (April 11 & 12).

Agenda

Day One: Tuesday, April 10, 2012

7:30 - 9:00 a.m.	**Registration & Breakfast**
9:00 - 9:15 a.m.	**Welcome**
	Bart Aoki, Ph.D., Tobacco-Related Disease Research Program, University of California Office of the President
	Colleen Stevens, M.S.W., California Department of Public Health, CDIC/California Tobacco Control Program
9:15 - 10:15 a.m.	**Keynote Address:** The Food and Drug Administration, Tobacco Control and Research
10:15 - 10:30 a.m.	**Break**
10:30 - 12:00 p.m.	**Morning Scientific Sessions**
	New Horizons in the Early Detection of Lung Cancer
	New Tobacco Products and Nicotine Addiction
	FDA Regulation of Menthol and Other Additives in Cigarettes
12:00 - 1:45 p.m.	**Luncheon, Introductory Remarks and Presentation**
	Mary Croughan, Ph.D., Research Grants Program Office, University of California Office of the President
	John Maa, M.D., University of California, San Francisco, Division of General Surgery
1:45 - 2:00 p.m.	**Break**
2:00 - 3:30 p.m.	**Afternoon Scientific Sessions**
	Third-Hand Smoke (THS): The Toxicological Effects of Exposure
	Secondhand Smoke and Multiunit Housing
	Tobacco Related Health Disparities

3:30 - 3:45 p.m. **Break**

3:45 - 5:30 p.m. **Young Investigator Session**

Co-Moderators: Janice Tsoh, Ph.D., and Ricardo Munoz, Ph.D., University of California, San Francisco

Smoke-Free Homes Longitudinal Association with Adolescent Tobacco Initiation in a National Sample
Kristen Emory, University of California, San Diego

A Human Rights Framework for Ending the Sale of Mentholated Cigarettes in California: International Treaties and California
Mariaelena Gonzalez, University of California, San Francisco

Health Behaviors, Attitudes and Beliefs about Second/Thirdhand Smoking Exposure among Korean American Emerging Adults: A Qualitative Study
Jimi Huh, University of Southern California

Computational Design of Complement System Inhibitors Targeting C5aR
Chris Kieslich, University of California, Riverside

Regulation of Intracellular Calcium by Endothelial nAChRs and Pathological Angiogenesis
Jieun Lee, Stanford University

Evolution of Electronic Cigarette Product Design, Packaging, Labeling, and Quality Control
Monique Williams, University of California, Riverside

3:45 - 5:30 p.m. **Additional Afternoon Session**

Cigarette Tax Policies

5:30 - 7:30 p.m. **TRDRP Poster Session**

6:00 - 7:30 p.m. **Cornelius Hopper Awards Presentations and Reception**

Moderator: Marilyn Newhoff, Ph.D., CHHS, San Diego

State University

Cornelius Hopper, M.D., VP Emeritus, University of California Office of the President

7:30 p.m. **Adjourn**

Day Two: Wednesday, April 11, 2012

7:30 - 8:30 a.m. **Registration & Breakfast**

8:30 - 9:15 a.m. **Welcome**

Mary Strode, M.S., California Department of Public Health, CDIC/California Tobacco Control Program

Phillip Gardiner, Dr.PH, Tobacco-Related Disease Research Program, University of California Office of the President

Ron Chapman, M.D., M.P.H., California Department of Public Health

9:15 - 10:15 a.m. **Keynote Address:** Creating a Healthier California by Linking Research and Policy Approaches

Adewale Troutman, M.D., M.P.H., The Troutman Group

10:15 - 10:30 a.m. **Break**

10:30 - 12:00 p.m. **Morning Science-Practice Plenary:** The Tobacco Industry and the Retail Environment

Moderator: Mary Strode, M.S., California Department of Public Health, CDIC/California Tobacco Control Program

The Evidence Behind the Practice: Lisa Henriksen, Ph.D., Stanford University, Stanford Prevention Research Center

The Evidence-Based Practice: CTCP's New Retail Environment Advocacy Campaign: Tonia Hagaman, M.P.H., California Department of Public Health, CDIC/California Tobacco Control Program

12:00 - 1:30 p.m.	**Luncheon, Introductory Remarks and Presentation** Tobacco Industry in Your Backyard: California Campaign Contributions from Tobacco Interests Moderator: Phillip Gardiner, Dr.PH, Tobacco-Related Disease Research Program, University of California Office of the President Kimberly Weich-Reusche, American Lung Association in California
1:30 - 1:45 p.m.	**Break**
1:45 - 3:00 p.m.	**Poster Session and Informal Networking**
3:00 - 3:30 p.m.	**Tobacco Education and Research Oversight Committee (TEROC) Master Plan Overview** Moderator: Mary Strode, M.S., California Department of Public Health, CDIC/California Tobacco Control Program Michael Ong, M.D., Ph.D., University of California, Los Angeles, Division of General Internal Medicine and Health Services, Department of Medicine
3:30 - 5:00 p.m.	**Afternoon Science-Practice Plenary:** The Environmental and Public Health Impact of Tobacco Waste Moderator: Phillip Gardiner, Dr.PH, Tobacco-Related Disease Research Program, University of California Office of the President The Evidence Behind the Practice: Thomas Novotny, M.D., M.P.H., San Diego State University, Graduate School of Public Health The Evidence-Based Practice: CTCP's New Tobacco Waste Advocacy Campaign Caroline Kurtz, Ph.D., California Department of Public Health, CDIC/California Tobacco Control Program
5:00 p.m.	**Adjourn**

Day Three: Thursday, April 12, 2012

7:30 - 8:30 a.m.	**Breakfast**
8:30 - 8:40 a.m.	**Welcome**
	Caroline Kurtz, Ph.D. and Mary Strode, M.S., California Department of Public Health, CDIC/California Tobacco Control Program
	Norval Hickman, Ph.D., M.P.H., Tobacco-Related Disease Research Program, University of California Office of the President
8:40 - 9:00 a.m.	**Morning Plenary:** State of Tobacco Control in California
	Colleen Stevens, M.S.W., California Department of Public Health, CDIC/California Tobacco Control Program
	Eric Batch, M.P.P., American Heart Association of California
9:00 - 9:45 a.m.	**Keynote Address**: Community Intervention: The Many Faces of Sustainability
	Moderator: Caroline Kurtz, Ph.D., California Department of Public Health, CDIC/California Tobacco Control Program
	Edison Trickett, Ph.D., University of Illinois at Chicago, Department of Psychology
9:45 - 10:00 a.m.	**Break**
10:00 - 12:00 p.m.	**Morning Workshops**
	Tracks:
	Policy Advocacy Strategies
	Engaging and Involving Communities/Achieving Health Equity with Tobacco Control
	Emerging Tobacco Control Issues

12:00 - 1:00 p.m.	**Luncheon and Carol Russell Award Presentation** April Roeseler, M.S.P.H., California Department of Public Health, CDIC/California Tobacco Control Program
1:00 - 2:00 p.m.	**Poster Session**
2:00 - 2:45 p.m.	**Keynote Address:** The Long View of Advocacy: Moving Public Health from the Political Kill Zone to the Great Reset Moderator: Caroline Kurtz, Ph.D., California Department of Public Health, CDIC/California Tobacco Control Program Gene Matthews, J.D., Network for Public Health Law, North Carolina Institute for Public Health
2:45 - 3:00 p.m.	**Break**
3:00 - 4:00 p.m.	**Afternoon Workshops** Tracks: Policy Advocacy Strategies Engaging and Involving Communities/Achieving Health Equity with Tobacco Control Demonstrating Program Performance and Effectiveness Emerging Tobacco Control Issues
4:00 p.m.	**Adjourn**

Scientific Abstracts

Posters Displayed on April 10, 2012

HOW SMOKING CAUSES DISEASE

Nisana Andersen, Department of Chemistry, University of California, Riverside

Jianshuang Wang, Yong Jiang and Yinsheng Wang, Department of Chemistry, University of California, Riverside

In vivo and In Vitro Replication Studies of O2-Methylthymidine and O4-Methylthymidine

Over 4000 compounds have been identified in cigarette smoke, including several tobacco-derived N-nitrosamines. Numerous DNA adducts have been identified and quantified in the tissues of animals exposed to tobacco-derived N-nitrosamines; two minor-groove O2-alkyl-thymidines were among the most abundant of these DNA lesions. In order to assess the mutagenic potential of O2-alkyl-thymidines we investigated two methylated thymidines, O2-MdT and O4-MdT. By site-specifically incorporating these two lesions into oligodeoxynucleotides, we investigated how O2-MdT and O4-MdT perturb the efficiency and fidelity of DNA replication both in Escherichia coli cells and in vitro using three different DNA polymerases, the exonuclease-free Klenow fragment of Escherichia coli DNA polymerase I (Kf), human DNA polymerase kappa (pol kappa) and Saccharomyces cerevisiae DNA polymerase eta(pol eta). Our results revealed that both O2-MdT and O4-MdT blocked DNA replication and if left unrepaired, O-methylated thymidine lesions may constitute important sources of nucleobase substitutions and deletions.

John Bielicki, State University Long Beach

Ying Zheng, Sea Kim, Vasanthy Narayanaswami, Gregory L. Hura, Anthony Lavarone, The Regents of the University of California Berkeley, Lawrence Berkeley National Laboratory and State University Long Beach

Evidence that Acidic Glutamate Residues within EXXXK Motifs Direct Site-specific Lysine Modification by Acrolein within Class A Helical Motifs based on HDL Proteins

Smoking cigarettes produces highly reactive a,b-unsaturated aldehydes, such as acrolein, that contribute to the development of disease. Despite the known ability of acrolein to damage proteins, factors governing its reactivity with the e-amino group of lysine are poorly understood. Presently we used a small 26-mer a-helix peptide (ATI-5261) to evaluate whether acidic residues promote site-specific lysine modification by acrolein and if this targeting more greatly reduced cholesterol efflux activity of the peptide vs. lysine modifications not influenced by acidic residue motifs. Exposure of ATI-5261 to acrolein produced a dramatic and concentration-dependent reduction in cholesterol efflux activity, small change in a-helicity, and FDP-lysine adducts at positions 5 and 25. Amino acid substitution- (K>R) and mass spectrometry- experiments revealed neither K5 nor K25 was preferentially modified by acrolein, despite the unique configuration of K5 within a putative EXXXKXXE motif. Moreover, both lysine residues

remained equally reactive when lipidated peptide was exposed to acrolein. Placing lysine in the center of the a-helix (R5/K14 exchange), however, created a EXXXK motif specifically targeted by acrolein, but this failed to augment the inhibitory action of the aldehyde. Rather, acrolein inhibited the cholesterol efflux activity of ATI-5261 in a manner dependent on the overall number of lysine residues/modifications. These studies are the first to demonstrate that acidic residues direct lysine modification by acrolein and that this process can be modeled using a small a-helix peptide. The studies are relevant for devising therapeutic strategies to combat tobacco-related disease.

Wenyong Chen, Beckman Research Institute

Exploring Roles of the Stress-response Gene SIRT1 in RAS-dependent (lung) Cancers

RAS oncogenes are among the most frequently mutated genes in human cancers, especially in lung, pancreas, colon/intestine, biliary tract and skin cancers. KRAS (a major cellular form of RAS) is mutated in about 20% lung adenocarcinoma and tobacco smoking increases or is associated with mutations of RAS oncogenes. Mutant RAS-driven cancers are highly chemoresistant and notoriously difficult to treat. RAS oncoproteins are localized onto cellular membranes for their biological functions through adding a fatty acid chain, a process termed farnesylation. However, targeting RAS functions through inhibition of farnesylation is largely ineffective for cancer treatment and molecular mechanism for this failure is not clear. Sirtuin deacetylase 1 (SIRT1) is an emerging lysine deacetylase that regulates mammalian stress response, aging and cancer. Although over-expressed in many types of human cancers, precise roles of SIRT1 in cancer are not fully defined and may be dependent on cellular and molecular contexts of cancers. Recently, we have found that BCR-ABL expression in hematopoietic progenitor cells increases SIRT1 expression by activating SIRT1 promoter, and SIRT1 upregulation is essential for efficient BCR-ABL transformation and mediates chemoresistance of chronic myelogenous leukemia. We hypothesize that SIRT1 may have a broad role in oncoprotein-mediated chemoresistance. We have found that SIRT1 is crucial for RAS transformation of normal cells to cancer cells, and that RAS proteins are subjected to modification by lysine acetylation. We propose that SIRT1 may regulate RAS functions by deacetylation and provides an alternative way for RAS activation when farnesylation is blocked. Our ongoing studies will reveal potential roles of SIRT1 in chemoresistance of RAS-dependent cancers. This study may have implication for improving treatment of RAS-dependent cancers including mutant RAS-bearing lung cancer by combinatory inhibition of SIRT1 deacetylation and RAS farnesylation or RAS downstream effectors.

Michael Dores, Department of Pharmacology, School of Medicine, University of California, San Diego

Buxin Chen(1), Huilan Lin(1), Unice J. K. Soh(1), May Paing(2), William A. Montagne(1), Timo Meerloo(3), and JoAnn Trejo(1)

(1)Department of Pharmacology, School of Medicine, University of California, San Diego, (2)Department of Molecular Microbiology, Washington University, (3)Department of Cellular and Molecular Medicine, University of California, San Diego, La Jolla

ALIX interacts with a YPX(3)L motif of Protease-Activated Receptor 1 and Mediates MVB/Lysosomal Sorting through an ESCRT-III-Dependent Pathway Independent of Ubiquitination (On signalling by PAR1 for thrombosis)

Long-term tobacco use causes endothelial cell damage and thrombosis, which can lead to myocardial infarction or strokes. Thrombin is a key mediator of thrombosis and mediates cellular responses through the activation of protease-activated receptor 1 (PAR1), a G-protein coupled receptor expressed on the surface of platelets, fibroblasts and endothelial cells. Thrombin irreversibly cleaves the N-terminus of PAR1, exposing a new N-terminus that contains a tethered ligand, activating the receptor. This process initiates a number of cellular responses, including platelet activation and the breakdown of the endothelial barrier. Regulation of PAR1 signaling is critical for proper homeostasis. Since activation by thrombin is irreversible, PAR1 internalization and lysosomal sorting for degradation is critical to prevent aberrant signaling. The molecular mechanisms of this important process are still unknown. During degradation, most GPCRs are modified with ubiquitin and sorted by ESCRT-0, -I, -II and -III complexes into intralumenal vesicles (ILVs) of multivesicular bodies (MVBs). However, it remains unclear whether a single universal mechanism mediates MVB sorting of all receptors. We previously showed that PAR1 is internalized after activation and sorted to lysosomes independent of ubiquitination and the ubiquitin-binding ESCRTs, Hrs and Tsg101. Here, we now report that PAR1 sorts to ILVs of MVBs through an ESCRT-III-dependent pathway independent of ubiquitination. We further demonstrate that ALIX, a CHMP4/ESCRT-III interacting protein, mediates PAR1/ESCRT-III interaction. ALIX binds directly to a YPXnL motif localized within the PAR1 second intracellular loop via its central V-domain and directs the lysosomal degradation of PAR1. This study reveals a novel MVB/lysosomal sorting pathway for signaling receptors and provides insight into the molecular mechanisms that regulate thrombin-activated PAR1 signaling.

Jiing-Dwan Lee, Department of Immunology and Microbial Science, The Scripps Research Institute

Qingkai Yang, Xianming Deng, Bingwen Lu, Runqiang Chen, John R. Yates III, Nathanael S. GrayDepartment of Immunology and Microbial Science, The Scripps Research Institute, Department of Chemistry, The Scripps Research Institute, Dana Farber Cancer Institute, Harvard Medical School

Development of BMK1/ERK5-targeted Lung Cancer Therapy

Lung cancer is among the most common and most deadly smoking-related cancer. BMK1/ERK5 signaling pathway is involved in the malignant properties of lung tumor cells and lung tumor-associated angiogenesis. As such, we developed a pharmacological BMK1/ERK5 inhibitor which inhibits the progression of lung tumor in animals. Using this inhibitor, we also investigate the molecular action of this BMK1 blocker in stopping or slowing down the progress of lung cancer. We developed this BMK1 inhibitor by modifying ATP-competitive polo kinase kinase inhibitor BI-2536 resulted in the loss of polo kinase inhibition activity, but led to compounds with high selectivity toward BMK1. Subsequent structure activity-guided optimization resulted in the synthesis of XMD8-92. The drug seemed to be well tolerated, and the mice appeared healthy with no sign of distress. XMD-?92 treatment in both immunocompetent and immunodeficient mice blocked the growth of lung xenograft tumors by 95%.

This antitumor effect of XMD8-92 in lung xenograft tumor models was in part due to XMD8-92's capacity to inhibit tumor cell proliferation through the PML suppression-induced p21 checkpoint protein and by blocking of BMK1?s contribution in tumor-associated angiogenesis. In conclusion, we generated pharmacological BMK1 inhibitor and the preclinical data of this inhibitor showed that the BMK1 pathway is a promising target for effectively suppressing lung tumor growth. Future clinical trials should reveal whether blocking the activity of this cascade can bring greater efficacy and better tolerability to cancer patients compared with currently approved treatments that affect tumor cell proliferation, metastasis, and tumor-associated angiogenesis.

Giulia Falivelli, Sanford-Burnham Medical Research Institute

Xiaohui Huang, Lubo Zhang and DaLiao Xiao, Center for Perinatal Biology, Division of Pharmacology, Department of Basic Sciences, Loma Linda University School of Medicine

Prenatal Nicotine Exposure Enhances Vascular Ang II/ATR Signaling Leading to Development of Hypertensive Phenotype in Adult Rat Offspring

Objective: Cigarette smoking during pregnancy has adverse effects on fetal development and is associated with an increased risk of cardiovascular disease in offspring later in life. Our recent studies in rats have demonstrated that prenatal nicotine exposure increases blood pressure response to angiotensin II (Ang II) in male offspring in a sex-dependent manner. The present study tests the hypothesis that prenatal nicotine-induced hypertensive response is associated with an increase in vascular myosin light chain phosphorylation (MLC-p) dependent- and independent- signaling pathway in adult offspring. Methods: Nicotine or saline was administered to pregnant rats via subcutaneous osmotic minipumps throughout gestation and up to 10 days after birth. The vascular functional contractile studies and contractile protein and MLC phosphorylation levels were determined in the aortic vessels isolated from 5-month-old male adult offspring. Results: Prenatal nicotine treatment significantly increased Ang II receptor type 1 (AT1R) protein and mRNA levels in the vasculatures, compared with those from the saline control male offspring. The vascular calcium-binding protein, calmodulin levels were higher in nicotine-treated offspring than in the control group. Ang II caused a dose-dependent increase in MLC phosphorylation and vascular contraction. The Ang II-induced MLC-p levels were significantly higher in nicotine-treated animals than in saline control group. Consistent to the MLC-p, Ang II-induced contractile tensions were also enhanced by nicotine treatment. In addition, the ratio of Ang II-induced tension/MLC-p was significantly increased in nicotine-treated group compared with the saline group. Conclusions: The results indicated that prenatal nicotine enhanced vascular AT1R gene expression, and increased Ang II-induced MLC-p level (i.e. thick filament regulatory pathway) and ratio of tension/MLC-p (i.e. thin filament regulatory pathway). The nicotine-enhanced Ang II/AT1R-mediated transduction signaling pathways may play a key role in fetal programming of development of hypertensive phenotype in adult offspring (Supported in part by the TRDRP 18KT-0024 and NIH R03DA032510).

Longhou Fang, University of California, San Diego

1 Simone R. Green,1 Ji Sun Baek,1 Sang-Hak Lee,1 Felix Ellett,2,3 Elena Deer,1 Graham J. Lieschke,2,3 Joseph L. Witztum,1 Sotirios Tsimikas,1 and Yury I. Miller1, 1Department of Medicine, UCSD, 2 Cancer and Haematology Division, Walter and Eliza Hall Institute of Medical Research, 3Australian Regenerative Medicine Institute, Monash University

Expression of Oxidation-specific Antibody Attenuates Vascular Lipid Accumulation in Hypercholesterolemic Zebrafish Hypercholesterolemic Zebrafish

Oxidative modification of LDL is an early pathological event in the development of atherosclerosis. Oxidation events such as malondialdehyde (MDA) formation may produce specific, immunogenic epitopes. Indeed, antibodies to MDA-derived epitopes are widely used in atherosclerosis research and have been demonstrated to enable cardiovascular imaging. In this study, we engineered a transgenic zebrafish with temperatureinducible expression of an EGFP-labeled single-chain human monoclonal antibody, IK17, which binds to MDA-LDL, and used optically transparent zebrafish larvae for imaging studies. Feeding a high-cholesterol diet (HCD) supplemented with a red fluorescent lipid marker to the transgenic zebrafish resulted in vascular lipid accumulation, quantified in live animals using confocal microscopy. After heat shock-induced expression of IK17-EGFP, we measured the time course of vascular accumulation of IK17-specific MDA epitopes. Treatment with either an antioxidant or a regression diet resulted in reduced IK17 binding to vascular lesions. Interestingly, homogenates of IK17-EGFP expressing larvae bound to MDA-LDL and inhibited MDA-LDL binding to macrophages. Moreover, sustained expression of IK17-EGFP effectively prevented HCD-induced lipid accumulation in the vascular wall, suggesting that the antibody itself may have therapeutic effects. Thus, we conclude that HCD-fed zebrafish larvae with conditional expression of EGFP-labeled oxidation-specific antibodies afford an efficient method of testing dietary and/or other therapeutic antioxidant strategies that may ultimately be applied to humans.

Longhou Fang, University of California, San Diego

Green SR, Baek JS, Lee SH, Ellet F, Deer, E, Lieschke GJ, Witztum JL, Tsimikas S, Miller YI, UC San Diego

In Vivo Visualization of Oxidized Lipid Accumulation in Zebrafish

Oxidative modification of low-density lipoprotein (LDL), which is manifest during atherogenesis, produces immunogenic oxidation-specific epitopes. Antibodies to malondialdehyde (MDA)-derived epitopes are widely used in atherosclerosis research and have been recently suggested for cardiovascular imaging. In this study, we engineered a transgenic zebrafish with conditional expression of a single-chain human monoclonal antibody IK17, which binds to MDA-LDL, and used optically transparent zebrafish larvae for imaging studies. Feeding a high-cholesterol diet (HCD) supplemented with a red fluorescent lipid marker to hsp70:IK17-EGFP zebrafish resulted in vascular lipid accumulation, quantified in live animals using confocal microscopy. Following heat shock-induced expression of IK17-EGFP, we measured the time course of vascular accumulation of IK17-specific MDA epitopes. Treatments with probucol or a regression diet resulted in reduced IK17 binding to vascular lesions.

Homogenates of IK17-EGFP-expressing larvae bound to MDA-LDL and inhibited MDA-LDL binding to macrophages. Moreover, sustained expression of IK17-EGFP effectively prevented HCD-induced lipid accumulation in the vascular wall. These results demonstrate that enhanced lipid oxidation is causally related to vascular lipid accumulation, which IK17 imaged and inhibited. HCD-fed zebrafish larvae with conditional expression of oxidation specific antibodies afford an efficient method of testing dietary and/or other therapeutic anti-oxidant strategies that may be eventually applied to humans.

Simone Filosto, Center for Comparative Respiratory Biology and Medicine

Samuel Chung and Tzipora Goldkorn, Genome and Biomedical Sciences Facility (GBSF); University of California School of Medicine, Davis

Neutral Sphingomyelinase2 is a Novel Target in Cigarette Smoke-induced Lung Injury; Insights into Molecular Mechanisms Controlling its Activity and Protein Stability

RATIONALE: Cigarette smoke (CS) is widely associated with lung injury and related diseases such as Chronic Obstructive Pulmonary Disease (COPD), a major source of morbidity and mortality. Despite the accepted link between CS and COPD, the molecular mechanism(s) underlying the disease etiology are not well understood, and therefore there are no effective medical interventions. We recently found that the neutral sphingomyelinase 2 (nSMase2) enzyme is a novel and critical target in CS-induced lung injury [Filosto et al., AJRCMB. 2011, 44]. We demonstrated both in vitro (in human airway epithelial (HAE) cells) and in vivo (in mice and in human lung tissue samples) that nSMase2 is the only SMase whose expression and activity are both up-regulated in the lung epithelia following exposure to CS-induced oxidative stress. This led to increased ceramide generation (via sphingomyelin hydrolysis) and subsequent induction of apoptotic death in lung epithelial cells, which is the initiation step of injury-related lung diseases. Therefore, the present study was undertaken to elucidate the molecular mechanism(s) controlling nSMase2 expression and activity in lung epithelia exposed to CS. METHODS: Cloning and site-directed mutagenesis of a V5-tagged-nSMase2 along with several biochemical techniques were employed to investigate the phosphorylation-based mechanisms that regulate nSMase2 activity and protein stability in HAE cells exposed to CS. RESULTS: We recently demonstrated that nSMase2 activity is up-regulated following exposure of HAE cells to CS and that the oxidative stress generated by CS exposure (in form of H2O2) is responsible for such nSMase2 modulation [Levy et al., AJPLCMP. 2009, 297]. Moreover, we demonstrated that calcineurin (CaN) phosphatase directly binds to nSMase2, dephosphorylates it and thereby deactivates it, but not under oxidative stress, when CaN is degraded, and thus nSMase2 is phosphorylated/activated downstream of protein kinase C(s) and p38-mitogen activated protein kinase [Filosto et al., JBC. 2010, 285]. Here we identify five specific phosphorylated serines of nSMase2 and show that such phospho-residues post-translationally regulate nSMase2 activity and expression following CS/oxidative stress exposure of HAE cells. We show that a nSMase2 mutant lacking the five phospho-serines cannot generate ceramide in HAE cells and is further not activated under CS/oxidative stress, unlike the wild type (WT) nSMase2. Subsequently, we present that four specific phospho-serines control nSMase2 activity in an inter-dependent manner and further identify a specific serine that seems to trigger nSMase2 activity upon CS/oxidative stress exposure. In addition, we demonstrate that the phosphorylation level of nSMase2 and its protein stability are linked,

thereby providing a mechanistic explanation for the over-expression of nSMase2 observed in lungs exposed to CS; accordingly, we indicate a new post-translational regulatory effect of CaN on nSMase2 stability/protein expression. CONCLUSIONS: Structure/function insight is provided on nSMase2 sites of phosphorylation. Phosphorylation of specific residues activates and stabilizes nSMase2 upon exposure of HAE cells to CS/oxidative stress. We offer key links to future studies aiming to fully elucidate the nSMase2 regulatory machinery.

Azucena Gomez-Cabrero, The Scripps Research Institute

A., Liao, D., Nguyen, G., Reisfeld, Ralph A., The Scripps Research Institute

An Inhibitor of the NF-kappaB Pathway Targets Cancer Stem Cells and Delays Tumor Recurrence in Human NSCLC

Introduction: Multidrug resistance and tumor recurrence are two of the major challenges in cancer treatment. Cancer stem cells (CSCs), found in most solid tumor types including NSCLC, have been proposed as the root cause of cancer growth and recurrence. These CSCs share similarities with normal Stem Cells, such as "stemness" gene profile expression, overexpression of transcription factors Sox2, Nanog and Oct4, as well as ability to grow in spheres and to repopulate lung tumors in vivo. Additionally, CSCs also have a high resistance to chemotherapeutic agents, probably due, in part, to their dormancy and overexpression of ABC transporters. Other serious limitation of cancer chemotherapies are their many toxic side effects, partially due to ineffective targeting to tumors and their microenvironment (TME). To address this issue, we developed targeted nanoparticles (tNP) to deliver chemotherapeutic drugs specifically to lung tumor cells and their TME by using a small synthetic specific inhibitor of Legumain, an asparaginyl endopeptidase overexpressed on such cells. Objective: Targeting cancer stem cells with a NF-kappaB inhibitor to delay cancer recurrence in a murine model of human NSCLC. Methology: Since CSC markers are highly variable between cell lines, as well as patients and tumor samples, we used a functional assay to select a drug candidate targeting CSCs of human NSCLC cell lines, based on their capability to efflux cationic dyes such as Hoechst 33324 by a side population of cells (SP). After in vitro characterization of this compound’s effects on CSCs, its in vivo efficacy on suppression of tumor growth and metastasis was tested in combination with Doxorubicin, delivered by tNP to the TME, in a model of human NSCLC cell xenografts in mice. Results: This drug decreased SP and sphere formation in vitro, and reduced protein expression of CSC genes such as Sox2, Nanog, Survivin and Oct4. Additionally, this drug substantially reduced tumor burden and prevented its recurrence in a preclinical setting, with little or no systemic toxicity. Conclusion: Combination of standard chemotherapy with a CSC-directed molecular therapy can be a key to the successful eradication of cancer and significant delay of its recurrence.

Michael Katiraie, Translational Sciences Section, School of Nursing, David Geffen School of Medicine, University of California

Deborah L. Feairheller, Ph.D.1, Ingrid Schmid2, & Christian K. Roberts, Ph.D., FACSM1, 1Translational Sciences Section, School of Nursing, 2Division of Hematology and Oncology, Department of Medicine, David Geffen School of Medicine, University of California, Los Angeles

CD34+ Subset Quantification in Young Adult Chronic Smokers and Recreationally-Active Non-Smokers by a Novel Gating Strategy

PURPOSE: Endothelial progenitor cells (EPC) are an accepted predictor of cardiovascular disease risk. Accurate identification of EPC is debatable, and to date identifying markers and isolation techniques remain to be clearly established. Primitive EPC are conventionally defined as CD34+CD133+KDR+. Few studies have investigated CD34+ EPC that are endothelial in nature, and their phenotype and relation to subsets of hematopoietic cells remain elusive. Thus, reliable flow cytometry acquisition and analysis strategies are needed as EPC comprise < 1% of peripheral blood mononuclear cells. Previously, it has been shown that long-term smoking decreases circulating CD34+ cells in older individuals. We designed and optimized a novel cytometry protocol for accurate enumeration of EPC in recreationally-active, non-smoking young adults (n=38, 22.5±0.6yr) compared to chronic smokers (n=28, 25.0±0.8yr) as part of a randomized-controlled trial (RCT) to investigate the effects of resistance training (RT) on vascular function in young, adult chronic smokers. METHODS: Using a whole blood lysing method, 2x107 cells were stained with a 5-color antibody panel and propidium iodide for dead cell exclusion. 4x106 cells were acquired to achieve sufficient events to classify PC reliably as viable, side scatterlow, CD45-/dim, CD3-CD19-CD33-CD34+ and subdivide them into CD133+ and KDR+. To improve the accuracy of rare EPC analysis in samples with varied red cell contamination of the gating region, we based our calculation of EPC frequency not on lymphocyte scatter gating, but on a novel strategy of a combination gate of CD45bright and CD34+. RESULTS: Preliminary data show that compared to non-smokers, smokers have a higher percentage of CD133+ (50±2.1% vs. 33±3.4%, p=0.0002), but lower KDR+ within the CD34+ subset of cells (1.9±0.44% vs. 4.6±1.0%, p=0.03). Interestingly though, smokers had a higher proportion of CD45bright lymphocytes than non-smokers (89±2.4% vs. 78±3.6%, p=0.02). CONCLUSION: We demonstrated the ability to detect specific circulating EPC subsets using our novel gating strategy. In young smokers, compensatory mechanisms may prevent the decline in CD34+ cells before true endothelial dysfunction exists. Our ongoing RCT will determine if RT has an effect on the number of EPC and EPC subsets in chronic smokers.

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Targeting the Ligand-Binding Domain of the Platelet Thromboxane A2 receptor for Therapeutic Interventions

Despite the well-documented involvement of thromboxane A2 receptor (TPR) signaling in thrombotic diseases, there are currently no antagonists available for clinical use. To this end, previous work has defined the C-terminus of the second extracellular loop (C-EL2) of TPR as the ligand binding site, and mapped the amino acids which mediate ligand interaction. Since EL2 contains the ligand binding pocket, we hypothesized that an antibody (referred to as C-EL2Ab) that targets this domain would exhibit biological activity. On this basis, we investigated the capacity of C-EL2Ab to block TPR-dependent platelet aggregation. Our initial results demonstrated the C-EL2Ab blocked human and mouse platelet

aggregation triggered by the TPR agonist U46619, in a dose-dependent fashion (in vitro); whereas control experiments revealed that it did not produce any detectable effects on aggregation by ADP. Together, these findings suggest that C-EL2Ab acts as a selective antagonist for TPRs. Consistent with this notion, we found that C-EL2Ab displaced a radio-labeled TPR antagonist (i.e., [3H]SQ29,548) from its platelet TPR binding sites. Finally, using ex vivo experimental settings, it was found that intravenous tail injections of C-EL2Ab resulted in significant blockade of mouse platelet aggregation by U46619, but not by ADP. On the other hand, separate control experiments indicated that normal rabbit IgG and an antibody which targets a TPR domain separate from those involved in ligand recognition, failed to inhibit aggregation in response to TPR activation. In summary, these studies show that C-EL2Ab dose-dependently blocks platelet aggregation induced by the TPR pathway, under both in vitro and ex vivo conditions, and that these effects are mediated via direct interaction with the receptor protein. Collectively, these results clearly demonstrate that C-EL2Ab exerts TPR-specific anti-platelet effects, thus making it the first function-blocking antibody against these receptors. Moreover, the identification of a functionally active TPR sequence will significantly aid molecular modeling study predictions for organic derivatives which possess in vivo activity.

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The Role of Endothelial MicroRNA-126 in Lung Tumorigenesis

Angiogenesis, the process of new blood vessel formation, is essential in promoting tumor expansion and the metastasis of non-small-cell lung cancer (NSCLC). MicroRNA-126 (miR-126), an endothelial-specific microRNA, positively regulates angiogenesis in response to angiogenic growth factors, including vascular endothelial growth factor-A (VEGF-A). Several conflicting reports exist regarding the role of miR-126 in NSCLC with some suggesting miR-126 acts as a tumor suppressor, while others have suggested miR-126 serves as a negative prognostic factor in NSCLC. These studies however, have focused exclusively on miR-126 function in tumor cells rather than endothelial cells. In our studies, we have detected a 3-fold increase of miR-126 in lung tumors from a murine model of NSCLC versus normal lung. Moreover, immunofluorescence analysis of the miR-126/Egfl7 transcription unit using Egfl7 staining as a surrogate reporter for miR-126 expression revealed Egfl7 overlaps with the endothelial marker CD31 and is robustly upregulated in tumor nodules compared to surrounding normal parenchyma. Ongoing studies are using transgenic mice with loss-of-function miR-126 alleles in combination with the LSL-KrasG12D; p53flox/flox conditional mouse model of NSCLC. Experiments performed in vitro have demonstrated miR-126 overexpression in human umbilical vein endothelial cells (HUVECs) suppresses apoptosis. These results suggest that endothelial-derived miR-126 may play a role in promoting the survival of lung tumor vasculature and thus may be an effective anti-angiogenic target in the treatment of lung cancer.

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Reversible Covalent Kinase Inhibitors of RSK Kinase to Combat Metastasis

The p90 ribosomal S6 kinase (RSK) has been shown to act as an effector in the RAS-ERK pathway to promote invasive cell migration and epithelial-mesenchymal transition in several cancer cell lines. RSK was shown to induce the expression of several genes that are implicated in invasive cell migration and metastasis. Inhibition of RSK2 with siRNA or small molecule inhibitors resulted in inhibition of invasive cell migration in head and neck squamous cell carcinoma (HNSCC) cells, as well as reduced phosphorylation and activation of genes promoting metastasis and invasive cell migration. These observations suggest that RSK is a novel target to inhibit metastasis in therapy for head and neck as well as lung cancer. Our goal is to design electrophiles that can bind to non-conserved cysteines near the kinase active site in a covalent but reversible manner resulting in sustained occupancy of the kinase active site with a slow off-rate, thus acting as highly selective inhibitors with high potency and low toxicity. We had previously developed an inhibitor of the kinase RSK2 that can form a covalent bond with its target. We have shown that this bond formation occurs in a reversible manner with off-target proteins, but is long-lived with RSK2, thus enabling selective kinase inhibition and avoiding the potentially harmful effects of covalent binding to off-target proteins. We have now further optimized this inhibitor for potency toward RSK2 by structural modification and our studies have afforded compounds that display greater chemical stability under physiological conditions as well as improved potency toward RSK in cells relative to the parent compound. Our new inhibitors have also been shown to completely inhibit RSK in various tissues in a mouse. We have overcome the difficulties caused by lack of stability of our parent compound, and we have now a much better understanding of the structural features that enhance stability under physiological conditions. Our goal was also to develop structural modules comprising carbon-carbon double bonds (olefins) bearing pairs of chemical functionalities that would display reversible, covalent binding of thiol groups present in proteins. To this end, we have prepared and tested several such olefins bearing combinations of such activating groups and found many that react with model thiols in a rapidly reversible, covalent manner. However, most of these compounds display poor stability under physiological conditions. We will carry out further structural modifications to understand factors promoting stability of such modules in order to overcome this drawback, prior to incorporating them in kinase-binding scaffolds to test enzyme inhibition. In summary, we have developed multiple inhibitors of the RSK family of kinases that exhibit favorable drug-like stability under physiological conditions while retaining their effectiveness in cells. We have also made forays into understanding the nature of the chemical groups needed to activate olefins in order to bind thiols of proteins in a rapidly reversible, covalent manner.

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Sidestream Cigarette Smoke Impaired Stem Cell and Pulmonary Fibroblast Attachment, Proliferation, and Migration

Cigarette smoking adversely affects prenatal development and causes cognitive and respiratory problems. There has been an increased public interest in harm reduction (HR) cigarettes, which are advertised to have fewer toxins and to be safer to smoke than conventional brands. The purpose of this study was to compare the effects of mainstream (MS) and sidestream (SS) cigarette smoke on human embryonic and mouse neural stem cells and differentiated adult lung fibroblasts. MS smoke is actively inhaled by smokers, and SS smoke burns off the end of a cigarette. Embryonic and neural stem cells are of interest because in utero exposure to cigarette smoke is often correlated with low birth weights and cognitive deficits, and it is known that early stages of development are very sensitive to environmental chemicals. In addition, human embryonic (hESC) and mouse neural (mNSC) stem cells are models for the epiblast and developing brain cells, respectively. Human pulmonary fibroblasts (hPF) represent a cell type from the respiratory system, which is a direct target of inhaled smoke. Attachment, survival, and proliferation of the three cell types were evaluated using dose response MTT experiments, which measured cell viability. Doses ranged from 0.001 to 1.0 puff equivalent (PE) where 1 PE equals the amount of smoke in 1 puff that dissolved in 1 ml of medium. Results showed that MS smoke did not affect attachment, survival, or proliferation of any of the cell types. However, SS smoke inhibited each endpoint in all cell types, and hPF were the most sensitive cell type followed by mNSC and hESC. hESC attachment was inhibited at 1PE and proliferation at 0.3PE. mNSC attachment was inhibited at 0.3PE and proliferation at 0.03PE. hPF proliferation was inhibited at 0.03PE. In general, HR SS smoke was more potent than smoke from the conventional brand. We next evaluated hESC colony growth, mNSC confluency, and mNSC migration using live-cell imaging in conjunction with CL-Quant video bioinformatics software. HR SS cigarette smoke was more detrimental to hESC colony growth and mNSC proliferation and migration than conventional cigarette smoke, and SS smoke was more potent than MS smoke. In summary, in both the MTT assay and live-cell imaging assay, SS smoke was more potent than MS smoke, and HR SS smoke was generally more harmful than SS smoke from conventional brands. Doses used in this study were comparable to levels in tissues of human smokers, suggesting that exposure to HR smoke during early embryo development could affect the health of embryos and fetuses and cause adverse effects in adult lungs.

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Evaluating MUS81-EME1 as a Novel Anti-Cancer Therapeutic Target

A novel approach to cancer therapy is to take advantage of the replicative stress that tumor cells undergo during uncontrolled growth. MUS81-EME1 is an endonuclease involved in homologous recombination (HR) and rapidly dividing tumor cells are likely to depend on MUS81-EME1 to repair DNA damage associated with high levels of replication. In effect, this endonuclease has been identified as a potential anti-cancer therapeutic target that may disproportionately sensitize tumor cells to DNA damage-based therapy, while sparing adverse effects to normal cells. To evaluate MUS81-EME1 as a novel anti-cancer therapeutic target, my first aim is to elucidate the biochemical role of purified recombinant MUS81-EME1 using a fluorescence-based nuclease assay with various DNA substrates involved in HR. Then, the fluorescence-based assay will be utilized to conduct a high throughput

inhibitor screen to identify MUS81-EME1 inhibitors. Lastly, the mechanism of action for lead MUS81-EME1 inhibitors will be characterized and their effects on normal and tumor cells will be assessed. This work will establish MUS81-EME1 as a cancer therapeutic target and identify MUS81-EME1 inhibitors that could potentially be used as a novel anti-cancer therapeutic.

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Environmental Tobacco Smoke-mediated Oxidative Modification of the Anti-atherogenic Apolipoprotein E

While it is recognized that oxidized LDL is a risk factor for heart disease, the effect of oxidative stress on other lipoproteins and its role in heart disease is not understood. The objective of our study is to monitor the effect of involuntary exposure to environmental tobacco smoke (ETS) on plasma apolipoprotein E (apoE) status. ApoE is an anti-atherogenic protein that serves as a ligand for lipoprotein receptors, which mediate cellular internalization of triglyceride-rich lipoproteins, thereby lowering plasma levels of atherogenic lipoproteins. We evaluated if reactive aldehydes present in tobacco smoke (such as acrolein and 4-hydroxynonenal, 4-HNE) mediate oxidative modification of plasma apoE as a result of exposure to ETS. Compared to the control group exposed to filtered air (FA), rats exposed to low doses of ETS had lower total plasma apoE levels, a higher content of apoE in lipid-free state, higher levels of acrolein- and 4-HNE-modified apoE in the lipid-free fraction and higher plasma triglycerides level (116 ± 9.5 and 92 ± 17.2 mg/dL, for ETS and FA groups, respectively). In addition, LDL isolated from the ETS group appeared to be more susceptible to Cu2+-induced peroxidation. In parallel studies, we monitored the effect of oxidative stress mediated in vitro modification on recombinant rat apoE by acrolein and 4-HNE. A dose-dependent pattern of modification of apoE by acrolein was noted. Chemical denaturant-induced unfolding studies revealed that the overall fold of acrolein-modified apoE was significantly impaired. Modified apoE also demonstrated a decrease in binding affinity for heparin and lipid binding ability. Lastly, the LDLr binding ability of acrolein-modified apoE was significantly disrupted. Taken together, the combination of in vivo and in vitro results suggest that ETS exposure could lead to oxidative modification of apoE that can result in decreased clearance of pro-atherogenic plasma lipoproteins. Our study provides a mechanistic basis linking tobacco smoke- (including second hand smoke-) related oxidative stress, apoE and cardiovascular disease. The implication of our study is that sustained exposure to second-hand smoke can potentially lead to a pro-atherogenic profile and may predispose individuals to heart disease.

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KRT14+ cells in Smoking-induced Lung Carcinogenesis

Little is known about the mechanisms involved in the initiation and progression of lung cancer, even though lung cancer contributes to the most cancer-related deaths in the world. We previously described the presence of a specific population of cells that express keratin 14 (KRT14) in the airway epithelium during epithelial repair. These KRT14+ cells remained in the epithelium if aberrant repair occurred, and were also found in premalignant lesions of squamous metaplasia and dysplasia. We thus hypothesized that KRT14+ cells might be important in the initiation and progression of lung squamous cell carcinomas (SCC), a subtype of non-small cell lung cancer (NSCLC). To examine the role of KRT14+ repairing airway epithelial cells in lung carcinogenesis after smoking injury, we examined gene expression profiles from normal basal cells, premalignant lesions, and SCC cells within individual patients. To achieve this, we identified resected fresh frozen samples from four patients with SCC that included premalignant lesions adjacent to the tumor. We performed laser capture microdissection (LCM) to retrieve basal cells of the histologically normal adjacent airway epithelium, premalignant lesions, and SCC, all from the same patient and all identified by a pathologist. RNA was isolated and converted into cDNA and subsequently into RNA-seq libraries. The samples were sequenced on Illumina Genome Analyzer IIx or HiSeq machines with read lengths of 36 and 50 base pairs, respectively. The sequencing reads were generally of high quality, despite the poor quality and low quantity of starting RNA. An average of 46-61% of reads from each patient could be aligned uniquely to the human genome (build human genome hg19). The BEDTools utility coverageBed was used to compute reads per kilobase per million (RPKM) values to determine the expression corresponding to 52,974 Ensembl Gene (ENSG) IDs. We confirmed the differential expression of several genes whose expression has previously been reported to be significantly increased or decreased in SCCs. A linear mixed-effects model was used to identify genes whose expression increased or decreased from normal to premalignant to tumor samples across all four patients (treating sample category as a fixed effect and patient as a random effect). A total of 1210 genes were identified whose expression was associated with tumor progression (940 increased and 270 decreased, $p< 0.01$). An analysis was then performed with DAVID (Database for Annotation, Visualization and Integrated Discovery) to identify GO (Gene Ontology) terms, KEGG (Kyoto Encyclopedia of Genes and Genomes) pathways, and other terms that were enriched within the top 1000 genes whose expression increased with respect to tumor progression. DAVID analysis identified that terms relevant to cell cycle progression and cell growth were enriched within this list. In summary, we are using a highly innovative approach to examine KRT14+ cells in premalignant lesions in comparison to normal airway epithelium and tumor cells. This approach can provide novel insights into the gene expression pathways altered within an individual's airway during lung cancer progression.

Arti Patel

Pyrene Fluorescence Analysis of Lipid-free and Lipoprotein-associated Apolipoprotein E3

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Targeting Oncogenic K-Ras with Small Molecules

Ras is one of the most commonly mutated proteins in cancer, including lung cancer. Oncogenic mutations turn Ras into its active state and uncontrolled growth and cancer often results. Activation of upstream proteins that signal through Ras can have the same effect. Therefore targeting Ras for intervention in cancer by turning it into its inactive form makes sense on two levels: Preventing Ras-mutants from causing constant activation and/or preventing normal Ras protein from relaying signals for activating cell growth and proliferation. However, attempts to target this protein pharmacologically have been almost entirely unsuccessful. We have taken a novel approach to specifically target an oncogenic mutant of K-Ras, glycine-12 to cysteine, most commonly found in lung cancer. This mutation positions a chemically tractable side chain near the active as well as an allosteric site. Taking advantage of this mutant we carried out a targeted screen using "Tethering", a technique that relies on forming a bond between the small molecule and the protein (cysteine). From the 480 screened compounds we identified 17 potential hits. We focused on the most potent of these hits and tried to understand how it binds to the Ras protein and potentially inactivates it. Using X-ray crystallography we obtained atomic resolution structures of this compound and improved chemical analogs bound to K-Ras. The compounds bind in the region of the protein used to interact with other signaling proteins (termed switch-2), suggesting that they may be able to block these interactions and turn Ras off. Furthermore, in vitro data, such as nucleotide exchange assays, indicate that compound-binding affects Ras ? protein interactions. Our hit compounds and its analogs may provide a starting point to develop cell permeable small molecules to explore Ras as new drug target in chemotherapy.

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Genome-specific Synthetic Lethal Targeting in Lung Cancer

Approximately 15% of non-small cell lung cancers harbor amplification of TITF1, a transcriptional regulator of normal lung development that when deregulated drives lung cancer growth. Transcription factors, however, are not readily “druggable”. The objective of our study is to discover “synthetic lethal” genes as those whose targeted knockdown is lethal in the context of TITF1 amplification. Towards this goal, we are carrying out a well-based small-interfering RNA (siRNA) screen, focusing on genes whose expression is correlated with TITF1 in lung cancer (and therefore enriching for key transcriptional mediators and compensatory pathways). We have identified suitable test cell lines (i.e. those with TITF1 amplification and addiction) and control cell lines, and using control siRNAs have optimized transfection

and screening conditions. Full library screens are ongoing. Findings should nominate useful therapeutic targets for the subset of lung cancers with TITF1 amplification.

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PHLPP1 Removal Protects the Brain from Ischemic Injury

Epidemiological studies have identified tobacco use as a clinical risk factor for increasing the incidence of cardiovascular disease including cardiac arrest and stroke. The impeded flow of blood from a stroke starves the brain of oxygen, glucose, and other vital nutrients and this in turn activates signaling cascades within the cells of the brain resulting in an ischemic injury. The serine/threonine kinase Akt regulates a wide variety of cellular processes including metabolism, cell growth, survival, protein synthesis, and gene transcription. Akt is activated by upstream kinases through sequential phosphorylation on its activation loop (Thr308) followed by phosphorylation on the hydrophobic motif (Ser473). Recently, a newly discovered protein phosphatase PHLPP (PH domain leucine-rich repeat protein phosphatase) has been shown to dephosphorylate Akt on its hydrophobic motif (Ser473), thereby decreasing kinase activity. We hypothesized that PHLPP is an important regulator of Akt signaling in astrocytes and that loss of PHLPP will accentuate Akt activation and protect the brain from ischemic insult. We recently generated phlpp1 null mice to investigate the cerebral phenotype induced by modulating physiological activation of Akt in vivo. Astrocytes isolated from PHLPP1 knock-out (KO) mice have increased Akt activity and display increased Akt phosphorylation following IGF-1 stimulation and protection from oxygen/glucose deprivation (OGD) compared to wild-type (WT) or PHLPP2 knock-down. PHLPP1 KO mice and WT mice were subjected 2 hours ischemia and 24 hours reperfusion by middle cerebral artery occlusion (MCAO). Infarct was significantly attenuated in PHLPP1 KO mice (12.7 ± 2.7% total infarct) compared to WT mice (22.9 ± 3.1% total infarct). Our data suggests that enhanced Akt activation by PHLPP removal significantly impacts stroke outcome and may be a possible therapeutic target.

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Role of BI-1 in Autophagy and Lung Cancer

Autophagy is a lysosomal degradation pathway involved in the turnover of organelles, proteins, and other cellular macromolecules. Dysregulation of autophagy has major deleterious effects, which are

evidenced by its involvement in numerous diseases such as cancer. Constitutive mitochondrial uptake of endoplasmic reticulum (ER) Ca2+ mediated by inositol triphosphate receptors (IP3Rs) maintains cellular bioenergetics, thus suppressing autophagy. We show that the cytoprotective ER membrane protein Bax-Inhibitor 1 (BI-1) promotes autophagy in an IP3R-dependent manner. By reducing steady-state levels of ER Ca2+ via IP3Rs, BI-1 influences mitochondrial bioenergetics activating AMPK and triggering autophagy. Using a xenograft model we demonstrated that BI-1 knockdown in lung tumor cell lines reduced tumor volume and tumor weight. Immunoblotting and immunohistochemistry analyzes showed that BI-1 knockdown tumors had reduced autophagy and increased cell death. The results reveal BI-1 as a novel autophagy regulator that bridges Ca2+ signaling between ER and mitochondria with direct implication in lung tumorigenesis.

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Role of inflammation in Lung Carcinoma Neovascularization and Progression

Tumor-associated macrophages promote lung tumor growth by stimulating angiogenesis and suppressing antitumor immunity. Thus, therapeutics that inhibit macrophage recruitment to lung tumors may provide new avenues for lung cancer therapy. Here, we show how chemoattractants stromal cell-derived growth factor 1 alpha (SDF-1a) and interleukin 1 beta (IL-1b) collaborate with myeloid cell integrin-alpha4beta1 to promote lung tumor inflammation and growth. Indeed, we found that SDF-1a and IL-1b are dominantly expressed in the microenvironments of murine lewis lung carcinoma tumors. Surprisingly, SDF-1a was expressed only by lung tumor cells, whereas IL-1b was produced only by tumor-derived granulocytes and macrophages. In vivo, both factors directly recruited proangiogenic macrophages to tissues, whereas antagonists of both factors suppressed tumor inflammation, angiogenesis, and growth. Inhibition of integrin alpha4beta1, SDF-1a, or IL-1b was sufficient to block lung tumor inflammation and growth, and the combined blockade of these molecules greatly accentuated these effects. Furthermore, antagonists of integrin alpha4beta1 inhibited chemotherapy-induced tumor inflammation and acted synergistically with chemotherapeutic agents to suppress tumor inflammation and growth (Schmid et al., Cancer Research, 2011). In addition, we identified that chemoattractants expressed in the lung tumor microenvironment induce myeloid cell recruitment by activating a novel PI3-kinase gamma-integrin alpha4beta1 signaling cascade. Importantly, pharmacological or genetic inhibition of PI3-kinase gamma activity reduced lung tumor inflammation, angiogenesis and progression. Furthermore, targeting PI3-kinase gamma activity also affected tumor immunity. Indeed, PI3-kinase gamma inhibition increased the expression of anti-tumorigenic cytokines in remaining tumor associated macrophages (Schmid et al., Cancer Cell, 2011). Taken together, these results suggest that targeting myeloid cell recruitment mechanisms can be an effective approach to suppress lung tumor progression. Selective inhibitors of PI3-kinase gamma could thus serve as therapeutics to suppress lung tumor malignancy by blocking diverse pro-inflammatory pathways.

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Teasing a(PAR)t the Mechanisms of Endothelial Barrier Protection by Activated Protein C

Activated Protein C (APC) is a naturally occurring anti-clotting and anti-inflammatory agent in the blood. Smoking has been linked to decreased blood APC levels that could contribute to increased risk of blood clot formation (thrombosis). Our study aims to understand the processes essential for APC's beneficial effects that will provide a potential new therapeutic target for treating tobacco-related cardiovascular disease. Blood vessels contain a layer of endothelial cells that form a semi-permeable barrier between blood and the surrounding tissue. The integrity of this barrier plays important roles in blood pressure regulation and blood clotting. Tobacco use causes oxidative stress-induced blood vessel injury and endothelial cell dysfunction by initiating inflammation and increases the risk of thrombosis that is mediated by thrombin (a blood-clotting agent). These early events contribute to the progression of chronic cardiovascular and pulmonary disease. Studies in mouse models suggest that APC's anti-inflammatory effects are due in part to its ability to stabilize endothelial barrier function through the G-protein coupled protease-activated receptor1 (PAR1), which can also initiate inflammatory response to thrombin. Activation of the same receptor by two distinct agents that cause different responses is an emerging pharmacological paradigm with implications in drug development. Impaired PAR1 function in the endothelium has been linked to blood vessel dysfunction in smokers however, the processes by which PAR1 promotes endothelial cell protection remains poorly understood. Using a combination of biochemical and fluorescent imaging techniques that complement cellular endothelial permeability assays, we demonstrate that in cultured human endothelial cells, APC activates a subpopulation of PAR1 residing in cholesterol-enriched vesicles to promote barrier protective responses independent of G proteins; instead PAR1 is preassembled with ß-arrestins, multifunctional adaptor proteins important for receptor signal fidelity. APC treatment promotes ß-arrestin-dependent recruitment and activation of dishevelled-2 (Dvl-2), a protein scaffold and key mediator of the Wnt/Frizzled signaling network that is an emerging paradigm in inflammation and immunity. Depletion of ß-arrestins or Dvl-2 resulted in the loss of APC-induced protection against thrombin-activated endothelial barrier permeability associated with the loss of adhesive junctions between endothelial cells but not thrombin-stimulated signaling. The role of PAR1 in thrombosis and vascular dysfunction is well documented however; these findings demonstrate that APC promotes PAR1-dependent endothelial barrier stabilization by utilizing a distinct repertoire of cellular proteins to promote adhesion between endothelial cells. Given that human recombinant APC is an FDA-approved drug that has been used for the treatment of severe sepsis, a life-threatening clinical condition resulting from uncontrolled inflammation and dysregulated blood clotting, these findings will enable the development of new strategies to manipulate PAR1 signaling and identification of new drug targets in the prevention and treatment of vascular inflammation and endothelial dysfunction, pathological conditions induced by smoking and is expected to have substantial impact on reducing healthcare costs related to tobacco use.

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Gene Modified Stromal Cell Therapy for Lung Cancer

We are assessing various therapeutic strategies against lung cancer. In this work in progress, we are evaluating the mechanisms to enhance CCL21 gene modified stromal cells (SC) therapy for lung cancer in combination with neutralization of immune suppressor cells. The rationale for using SC is that they can process and present antigens and be used for the delivery of immune potentiating cytokines locally in the tumors. SC contribute to the formation of tumor- stroma and the tumor preferentially promotes their engraftment as compared with other tissues making them an ideal system for tumor-selective delivery. We hypothesize that reprogramming the tumor microenvironment with SC modified to express CCL21 will alter the inflammatory infiltrates in the tumor and induces antitumor activity. The advantages of using transduced SC for paracrine secretion of cytokines are that SC: i) produce physiologically relevant levels of cytokines after transduction, ii) are readily available for culture and expansion, iii) provide a platform for the development of cytokine and antigen-based antitumor strategies, iv) can process and present antigens to T cells and vi) may potentiate the activities of immune and innate effectors in the tumor microenvironment. For translation to lung cancer patients we have the option to utilize bone marrow (BM) or adipose tissue derived MHC matched GMP grade donor SC from a tissue bank that will circumvent autologous preparation, minimize batch to batch variability and allow for comparability and standardization. Utilizing immune competent murine models, we are evaluating BM-SC for the delivery of CCL21 for lung cancer therapy. Administration of SC-CCL21 promotes T lymphocytes and dendritic cell recruitment into the tumor for antitumor activity. Localized intratumoral delivery of CCL21 circumvents the problems with systemic administration of recombinant cytokine or frequent high dose intratumoral delivery that has the potential of systemic toxicity. To deliver CCL21 locally we are utilizing high titer replication deficient adenoviral vector expressing CCL21 to genetically modify BM-SC cells. We are evaluating 1. Total adherent BM cells and 2. BM purified stromal cells [(BM-SC) CD45- CD11b-CD34-; 2-3% of total BM] for in vitro antigen processing and presentation activity (APC) and in vivo anti tumor activity. Following antibody mediated bead purification of BM-SC, we obtain 80-90% SC purity based on CD11b-CD34-CD45- cell surface expression markers. BM-SC express cell surface markers (MHC I, MHC II, CD80, CD86) that are essential for antigen processing and presentation (APC) activity. Total BM cells (50,000 APC:100,000 T cells; 90pg/ml IL-2) and the BM adherent cell populations that include a mixture of CD11b+ myeloid cells and BM SC (800pg/ml) efficiently process and present antigens to activate CD8 T cells. The cultured (12-14 days) adherent BM cell population shows a greater APC activity and is not impaired by Lewis Lung (3LL) tumor cells. Total BM cells can process and present antigens to the OVA specific CD4 T cells (50,000 APC: 100,000 T cells; 50pg/ml). CCL21 transduced adherent BM cell population inhibit the growth rate of the established subcutaneous 3LL cancer model in vivo. CCL21 gene modified adherent BM cell population is more effective at inhibiting tumor growth when administered to 5-day compared to day10 tumors. As the 3LL tumors progress, the frequency and

activity of immune suppressive cells (myeloid derived suppressor cells and Tregulatory cells) are enhanced in the tumor microenvironment and systemically. Tumors have as much as 45% infiltrates that are predominantly of the CD11b+GR1+ immature myeloid phenotype. We are evaluating antibody mediated neutralizing strategies to deplete immature myeloid cells (iMC) (anti-Gr1 or anti Ly6G) or inactivating T regulatory cells (anti-GITR) with an inactivating monoclonal antibody (anti-GITR) to enhance the antitumor activity of SC-CCL21. We evaluated the doses of antibody (100ug/dose per antibody) to inactivate the suppressor cells populations and the effects on tumor growth kinetics. There was a marked inhibition in tumor growth compared to controls [(RB6-8C5 anti-Gr1-8 fold), 1A8- anti-LY6G-7 fold) and DTH anti-GITR-10 fold) with restoration of APC and T cell activity in the tumor microenvironment. We will evaluate the role of BM as cellular antigen delivery vehicles following CCL21 transduction in the prophylaxis vaccination and therapeutic vaccination lung cancer models.

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Blocking Pro-inflammatory sPLA2-IIA-Integrin avß3 Interaction with Pyrazolylthiazole-tethering Peptides

Increased concentrations of secreted phospholipase A2 type IIA (sPLA2-IIA), have originally been found in the synovial fluid of patients with rheumatoid arthritis. sPLA2-IIA has thus been recognized as a therapeutic target for chronic inflammation. Several agents that inhibit the catalytic activity of sPLA2-IIA, however, failed to show potent anti-inflammatory action in animal models of chronic inflammation. We previously reported that sPLA2-IIA specifically binds to integrin avß3, and initiates a signaling pathway that leads to cell proliferation and inflammation. Therefore, the interaction between integrin and sPLA2-IIA could be a potential therapeutic target that can treat inflammation-related diseases. A one-bead-one-compound peptide library was constructed and screened, and seven target hits were identified. Herein we report the identification, synthesis, and biological testing of two pyrazolylthiazole-tethered peptide hits and their analogs. Biological assays showed that these compounds were able to suppress the sPLA2-IIA-integrin interaction, inhibit sPLA2-IIA induced cell migration and that the blockade of the sPLA2-IIA-integrin binding was specific to sPLA2-IIA and not to the integrin. These compounds are useful for designing potential anti-inflammatory agents with a novel mode of action.

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Misregulation of the EphA3 Receptor Tyrosine Kinase in Lung Cancer

The Eph receptors, the largest family of receptor tyrosine kinases, are an integral component of signal transduction pathways that control cellular growth and development. They have been implicated in various cancers and for this reason they are attractive therapeutic targets, although little is known about their role in lung cancer. Recent genomic screens have identified somatic mutations in many Eph receptors in cancer. Among all Eph receptors, EphA3 is the most highly mutated in lung cancer, and approximately 20 different missense mutations have been identified. We investigated how the EphA3 mutations identified in lung cancer and other types of cancer affect receptor function by expressing wild-type and mutant EphA3 in HEK 293 cells. Our experiments revealed that many of the mutations impair one or more aspects of EphA3 function, including ephrin ligand binding, kinase activity, domain conformation, and trafficking to the cell surface. Altogether, these results suggest that many of the mutations inhibit the ability of the receptor to activate signal transduction pathways in response to ephrin ligands. Besides the mutations, we also uncovered another mechanism that can silence EphA3 signaling in lung cancer cells. This involves an unusual interplay between EphA3 and a coexpressed ephrin ligand that results in inhibition of normal EphA3 signaling. Our findings support a role for the EphA3 receptor as a tumor suppressor in lung cancer. Moreover, they suggest that mimicking induction of EphA3 signaling by ephrin ligands could be a therapeutic strategy for lung cancer treatment. Supported by TRDRT 18XT-0099 (EBP) and 20FT-0076.

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Study of TSNA Signaling Pathway by Targeted Proteomics

Introduction: Tobacco-specific nitrosamines (TSNAs), such as 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) and N-nitrosonornicotine (NNN), are one of the most important groups of carcinogens found in tobacco products. Undoubtedly TSNAs are closely associated with smoking-induced lung cancer; however, the mechanisms of their carcinogenesis remain elusive. Given the crucial role of cell membrane proteins and nucleotide-binding proteins, including GTP/ATP-binding proteins, in cell signaling, we reason that quantifying systematically the change in expression levels of membrane proteins and GTP/ATP-binding proteins upon TSNA exposure might provide important knowledge for understanding TSNA-induced alteration of cell signaling pathway and offer significant new insights into the mechanisms of smoking-related lung cancer development. Our recent success of chemical tagging strategy involving specific labeling and enriching proteins with functional similarities from whole cell lysates builds up a solid foundation for the purification and quantification of membrane and GTP/ATP-binding proteins from human lung cells upon NNK/NNN treatment. In the first stage, we will employ synthesized isotope-coded biotin-based GTP and ATP affinity probes to selectively identify and quantify specific G proteins and ATP-binding proteins from cultured human lung cells with or without NNK and NNN treatment. Method: ATP/GTP affinity probes were synthesized by conjugating biotin-LC with ATP or GTP, and products were further purified by HPLC. Human cells were lysed and endogenous nucleotides in the lysate were removed by gel filtration using NAP-25 column. Subsequently, ATP/GTP affinity probe were added to the cell lysate and allowed to react for 4 hrs. After reaction, proteins in the cell lysate were digested by trypsin and the resulting biotin-labeled peptides were enriched by affinity columns

packed with avidin agarose resin. Finally the affinity purified peptides were analyzed by LTQ-Orbitrap velos and searched against Mascot for protein identification and quantification. Results: Biotin-LC-ATP/GTP probe have been successfully synthesized and purified by HPLC. Next we used the lysates of HL-60 human leukemic cells to identify the proteins that can bind to the probe. To this end, we removed the endogenous nucleotides from the lysate by gel filtration separation, allowed the ATP/GTP affinity probes to react with the lysate separately, digested the resulting cell lysate with trypsin, enriched the biotin-labeled peptides by using avidin agarose resin, and identified the probe conjugated peptides by online 2D LC-MS/MS. Initial trial with 100 μM biotin-LC-ATP probe with the 1mg lysate of HL-60 cells facilitated the detection of 1538 proteins, including 349 (23%) of known ATP binding proteins and 168 kinases. Likewise, the use of the biotin-LC-GTP probe allowed for the identification of 1355 proteins, including 66 known GTP-binding proteins in GO annotation. Successful identifications and quantification of large number of ATP/GTP-binding proteins built a solid foundation to probe the signaling pathway in human cells perturbed by TSNA. In the future, we plan to use highly reactive biotin-based affinity probe as acylating agent to selectively label and enrich G proteins and ATP-binding proteins from A549 human lung epithelial carcinoma cells and normal human embryonic lung cell line (IMR-90) with or without NNK/NNN treatment. We reason that this sub-proteome quantitative screening method focusing on G proteins and ATP-binding proteins can be employed for systematic identification of the cellular protein targets that are related to TSNA pathogenesis. Conclusion: The number of identified ATP/GTP-binding from human cell lysates increased significantly by applying biotin-based ATP/GTP reactive probe with extensive separation, which build a solid foundation for probing the signaling pathway perturbed by TSNA.

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O-linked Protein Glycosylation is a Key Regulator of Cancer Cell Growth and Central Metabolic Pathways

Cancer cells need to meet the metabolic demands of rapid cell growth within a continually changing microenvironment. Genetic mechanisms for reprogramming cellular metabolism toward proliferative, pro-survival pathways are well-reported. However, post-translational mechanisms, which would enable more rapid, reversible adaptations of cellular metabolism in response to protein signaling or environmental sensing systems, are less well understood. Here we demonstrate that the post-translational modification O-linked ß-N-acetylglucosamine (O-GlcNAc) is a key metabolic regulator of glucose metabolism. O-GlcNAc is dynamically induced at Ser529 of phosphofructokinase 1 (PFK1) in response to hypoxia. Glycosylation inhibits PFK1 activity and redirects the flux of glucose from glycolysis

through the pentose phosphate pathway (PPP), thereby conferring a selective growth advantage to cancer cells. Blocking glycosylation of PFK1 at Ser529 reduced cancer cell proliferation in vitro and impaired tumor formation in vivo. These studies reveal an unexpected mechanism for the regulation of metabolic enzymes and pathways, and pinpoint a new therapeutic approach for combating cancer.

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High Speed Long Imaging Range Fourier Domain Optical Coherence Tomography for Real Time Imaging of Human Upper Airway

Presently there are limited methods to provide structural and anatomical information on the upper airway with a relatively modest cost and without the risks of ionizing radiation. Furthermore, no currently available diagnostic tests can provide airway volumetric information in real-time for sustained time intervals. Endoscopic long range optical coherence tomography (OCT) enables ionizing free non-invasive high resolution cross-sectional optical imaging of biological tissue and can potentially address these needs. In this report, we present development and testing of a high speed long range endoscopic Fourier domain OCT (FDOCT) system capable of non-invasive real time acquisition of structural and anatomic information of human upper airway, which has a great potential for diagnosis of tobacco related diseases developing in respiratory tracts. The FDOCT system is based on a rapid wavelength swept source with frequency shifting techniques and can achieve an imaging rate of 100 frames/second. A rotating OCT endoscopic probe with working distance of 25 mm, outer diameter of 1.2 mm and rotating rate of 100 revolutions/second is designed to move within a stationary transparent protective biocompatible sheath with outer diameter of 3 mm. A high speed linear motor outside the endoscope is used to pull back the entire probe to create a 3-D helical scan. Parallel computing algorithms based on graphics processing unit (GPU) combined with a dual-quad-core high speed CPU processor implementing Intel hyperthreading are used to achieve real time processing and display. Preliminary data in healthy volunteers using a FDOCT system built by our group is demonstrated. The size of the probe is 3 mm in diameter. It is inserted into the nasal cavity of a volunteer after placement of topical anesthesia. Cross-sectional images of the upper airway, primarily the nasal cavity and nasopharynx, are obtained in real time. The pilot studies demonstrate the feasibility of performing endoscopic long range OCT for real time structural and anatomic imaging of the upper airway. This system can potentially provide an efficient non-invasive method to aid the physicians in the therapeutic decision-making.

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Personalized Diagnostics for Lung Cancer Using Next-Generation-Sequencing Technology

The innovative clinical application of next-generation-sequencing (NGS) technology to develop individualized diagnostics for cancer detection has been recognized recently. In previous studies, we have discovered and pre-validated a panel of salivary genes that shows the potential to detect lung cancer early and non-invasively. Recent development of NGS technology has enabled us to sequence dozens of genes in patient saliva samples using a simple workflow. We have tested a 46-gene cancer panel, of which the gene expression levels and mutations can be confirmed within just one day, starting with a single-tube reaction and 10 ng of RNA or DNA. This targeted gene re-sequencing procedure can be completed in 3.5 hours of total time, with less than 10 minutes of hands-on time, as fast and simple as standard qPCR or PCR. Our testing of this new technology has allowed detection of gene expression variation, as well as KRAS and EGFR alterations in lung cancer saliva samples. Furthermore, we have also tested the miRNA-seq technology to investigate the whole microRNA profile and discover microRNA biomarker in saliva samples. The NGS technology permits deep sequencing of a panel of mutations at the same time of measuring the relative quantities of these genes. It can detect variations and mutations at frequencies as low as 5 percent with short turn around time and low cost. This could be an ideal solution and hold a great potential for diagnostic applications. In principle, this non-invasive test could potentially be developed for any cancer patient, and used not only for early detection of recurrent cancer in the same patient in the future, but also to monitor an individual's response to different therapeutic options. This method represents an important foray into offering truly personalized cancer diagnostics.

DISPARITIES & CESSATION

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Co-Use of Tobacco and Alcohol and Quit Attempts among Young Adult Bar Patrons

Background: Bars and nightclubs are key public venues where young people often congregate and use both tobacco and alcohol together. The co-use and both substances and its effects on quit attempts are not known among California young adult bar patrons, who are particularly interesting due to California's longstanding smoke-free bar policies and increasing numbers of light and non-daily smokers. Objective: To examine the impact of alcohol use and bar attendance on smoking and quit attempts among young adult bar patrons aged 21-26, and to compare the results among occasional and regular, light and heavier smokers. Methods: Cross-sectional survey at bars in San Diego, CA using randomized time location sampling (N=1,235, response rate 73%). The prevalence of smoking when drinking alcohol and being in a bar was calculated. Outcome measures included smoking status (categorized into non-smoker, occasional, and regular smoker), cigarette consumption per day (categorized into light and heavier smoker), and having made a quit attempt in the past year. The main independent variables included alcohol use(categorized into non-drinker, occasional, and frequent drinker), and binge drinking (categorized into non-binge drinker, occasional, and frequent binge drinker). Multinomial logistic regression models were used to assess if drinking and binge drinking predicted each smoking category

and quit attempts, controlling for age, gender, race/ethnicity, and education. Results: Respondents reported high current smoking rate (47%). When drinking alcohol, 96% of current smokers reported any smoking, and 75% smoked more cigarettes than usual. When at a bar, 96% of current smokers reported smoking, and 69% smoked more than usual. When drinking alcohol at a bar, 95% of smokers smoked, 60% smoked at least half of the time in such occasions, and 24% smoked all the time. Drinking and binge drinking predicted almost all smoking categories, but occasional binge drinking was only associated with occasional and light smoking. About 41% of current smokers had tried to quit, and smokers reported drinking alcohol and bar attendance made it harder to quit. Among light smokers, frequent binge drinking was associated with less quit attempts. Discussion: Young adult bar patrons are at high risk for smoking and co-use of both alcohol and tobacco in spite of smoke-free bar policies. Young adult smoking cessation programs should prioritize bars and address co-use with alcohol, especially for occasional and light smokers. As co-use may be facilitated by smoking adjacent to the bar, policy makers should consider extending smoke-free bar policies to include outdoor spaces.

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Kuoch, Kimthai, The Cambodian Association of America

Determinants of Smoking Prevalence among Cambodian Americans in Long Beach

A pilot CARA grant received from the TRDRP (Grant #12BT-2201) funded the Cambodian Tobacco Research Initiative (CTRI). The CTRI is an ongoing collaborative effort between the Department of Health Science at California State University, Long Beach, and the Cambodian Association of America, Long Beach. This initiative addresses the challenges of tobacco use among the Cambodian population in this Southern California community. The specific aims were to obtain information about tobacco use and factors that influence avoidance, beginning, and stopping of smoking as well as to develop a strong alliance between the community and academic partners in order to collect data regarding smoking and other forms of tobacco use. Smoking rates among the Cambodian American population are believed to be high, ranging in some prevalence studies up to 50 percent for the total population and as high as 70 percent among men. In our pilot study that was based on focus groups derived from self-selected samples, we confirmed that rates of smoking are four times higher among men than among women. The reasons for the high rates of cigarette smoking included the fact that smoking is a part of Cambodian culture, is seen to have medicinal advantages, and is used to relieve stress. As a part of the pilot study, we conducted an extensive literature review. The results suggested that to date prevalence studies of tobacco use among Cambodian Americans have provided only limited information. Because of inconsistent findings among small-scale studies, further information is needed regarding frequency of cigarette smoking among the Cambodian population. The REACH 2010 study surveyed 1,026 Cambodian residents of Lowell, Massachusetts. Although the REACH study provided useful prevalence data, in-depth information on the culturally related reasons for smoking was not collected. Furthermore, there have been no large-scale prevalence studies of tobacco use in the city of Long Beach, which has the largest population of Cambodian residents outside of Cambodia. In order to augment previous research, the proposed project for a full CARA award will expand on the pilot CARA by addressing among the Cambodian population in the city of Long Beach the following specific aims: 1. Obtain prevalence

estimates of tobacco use among adults; 2. Further elucidate the cultural dimensions of cigarette smoking and other forms of tobacco use; and 3. Develop a multivariate model of sociodemographic and cultural factors associated with tobacco use. The investigators have identified a geographic region (the study population) within the city of Long Beach that has a high density of Cambodian residents. A representative random sample (n = 2,000) of the population will be selected by using a three-stage process. Stage one will include random selection of city blocks from census tracts within the Cambodian district. Stage two will involve selection of a stratified sample of the households that are likely to contain residents of Cambodian origin. In the third stage, we will interview all members of selected households who meet the criterion of being of Cambodian heritage. All selected community residents will be contacted by door-to-door bilingual interviewers. After informed consent is obtained, a tobacco use prevalence interview questionnaire will be administered. The community and academic partners will collaborate in conducting data analyses and disseminating research findings. The information gathered in the research project will be distributed widely within the community via local media outlets as well as published in professional journals and presented at scientific meetings. This project will contribute much needed information regarding cigarette smoking and other forms of tobacco use among a population that is afflicted by numerous health disparities.

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Active Smoking and Risk of Colorectal Cancer

Objective: Colorectal cancer, among the most common cancer in men and women, has not traditionally been thought to be associated with tobacco exposures. The overall objective of this study is to examine the risk of colorectal cancer associated with active and passive smoking among members of the California Teachers Study (CTS), a large cohort of female professional school employees for whom highly detailed smoking information is available. The specific aims include examining the risk of colorectal cancer associated with both active and passive smoking, considering details of dose, timing, and setting and to evaluate whether risks differ for tumors of the colon versus the rectum or by the specific anatomical subsite with the colon. Methods: We report here on the preliminary results of our active smoking analyses; our passive smoking analyses are currently still in progress. Our analysis of active smoking was limited to the 122,264 CTS participants who lived in California at entry in the cohort, had no prior history of colorectal cancer, and provided active smoking information at study entry in 1995. Cases of invasive colorectal cancer diagnosed 1995 through 2009 were identified through routine linkages of the CTS to the California Cancer Registry. 1,216 cases were identified during this time period, including 661 in the proximal colon, 267 in the distal colon and 288 in the rectum. Initial Cox proportional hazards models were run, stratified by age and adjusted for race/ethnicity. Subsequent multivariable models will be run, adjusting for a variety of behavioral, medical, and dietary risk factors. Results: Compared to never smokers, current smokers had an approximately 30% increased risk of colorectal cancer. This risk appeared to increase with greater intensity and duration of smoking. A slightly elevated risk was also noted for former smokers, but was only statistically significant for those

who had quit recently (within the last 5 years). Preliminary evaluations by anatomic subsite suggest these risks are uniform across cancers of the colon and rectum and within subsites of the colon. Conclusions: If these relationships persist when further adjustment for other risk factors are incorporated into our analyses, our results would provide convincing evidence for the importance of active smoking as a risk factor for colorectal cancer. Such evidence could provide the impetus for updating screening guidelines to target more aggressive screening among active smokers.

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Ethnicity Moderates the Relationship Between Subjective Social Status and Tobacco Use Among Young Adult Smokers

Subjective social status (SSS), one's subjective view of their social standing in comparison with others, is a significant predictor of health outcomes. Previous research has demonstrated stronger relationships between SSS and traditional measures of socioeconomic status (SES; e.g., education, income) for Caucasians compared to other ethnic groups [1]. There are also ethnic and socioeconomic differences in smoking behavior [2], suggesting that the relationships between SES, SSS, and smoking may be different for Caucasians compared to other ethnic groups. Further, limited research has examined patterns of SES, SSS and smoking among young adults a group that smokes at high rates. The present study investigated whether, controlling for household income and parental education (objective SES), ethnicity moderated the relationship between SSS and tobacco use among young adult smokers. Participants were N = 1987 young adults between the ages of 18 to 25 who reported smoking at least one cigarette in the past 30 days. Recruitment was conducted online from March 2009 to April 2010 via a free classified service, a paid advertisement campaign, and a paid email advertising campaign. Advertisements contained a hyperlink to the study's IRB-approved consent form; a screener for eligibility; and an online survey consisting of a demographic questionnaire and measures of tobacco, alcohol, and marijuana use. Compared to Caucasians, other ethnicities had: lower annual household income (?2(6) = 14.05, p < .05), lower parental education (?2(8) = 39.66, p < .001), longer time to first cigarette (?2(3) = 16.37, p < .01), fewer number of smoking days in the past 30 days (t(1985) = 2.88, p < .01), and smoked fewer cigarettes on average per day (t(1985) = 6.25, p < .001). SSS, however, did not differ significantly between Caucasians and other ethnic groups (t(1985) = 1.19, p = .234). A structural equation model tested whether annual household income, parental education, SSS, ethnicity, and the interaction between SSS and ethnicity predicted a tobacco use latent variable. The model fit the data well (2(10) = 68.29, p < .001; CFI = .97; RMSEA = .05). Higher levels of parental education were associated with lower tobacco use (b = -.08, p < .05), Caucasian ethnicity was associated with higher tobacco use (b = .30, p < .05), and the interaction between SSS and ethnicity was significant (b = -.18, p < .05). Follow-up analyses indicated that for Caucasians, controlling for parental education, higher SSS was associated with less severe tobacco use (b = -.60, p < .001), while for other ethnic groups, parental education was associated with SSS, but there was no significant relationship between SSS and severity of tobacco use. Our findings support the previous evidence that the relationships between SSS and health

behavior differ by ethnicity. The lower rates of tobacco use among ethnic minorities may have constrained the variance available to detect relationships among SSS and smoking severity, or SSS measurement may by sensitive to race/ethnicity, indicating a need to measure SSS in reference to a community rather than the entire United States [1]. References 1. Wolff, L.S., et al., Subjective social status, a new measure in health disparities research: Do race/ethnicity and choice of referent group matter Journal of Health Psychology, 2010. 15(4): p. 560-74. 2. Lawrence, D., et al., Cigarette smoking patterns among young adults aged 18-24 years in the United States. Nicotine & Tobacco Research, 2007. 9(6): p. 687-97.

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Purposeful and Incidental Quitting by College Students Who Smoke Cigarettes

Introduction: Recent studies indicate that a substantial proportion of college students smoke cigarettes, and that smoking initiation and progression continue during college. The college years form a transition from adolescence to adulthood, and represent a period during which tobacco use and other health behaviors are still being formed. Yet, surprisingly few studies to date have addressed smoking cessation in this population. The present study was designed to investigate college student efforts at quitting smoking. Methods: College students from two public universities were recruited to participate in a longitudinal study. Included were students 18 - 24 years of age who smoked at least one cigarette per week in the four weeks prior to study enrollment. Participants completed 3 in-person interviews and 4 online computer-administered surveys over the course of 6 months. Cessation was assessed for purposeful (motivated to quit and intends to stop smoking) and incidental (no intention to quit, but stop because of circumstances) quit attempts. Results: Overall, 113 participants enrolled in the study and completed baseline assessments. Of those 101 completed the 3-month follow-up assessment, and 89 completed 6-month follow-up assessments. Participants were of diverse ethnicities (42% White, 37% Asian, 11% mixed race, 6% Hispanic/Latino), 46% were female, and averaged 20.1 years of age (SD = 1.6). At baseline 54% reported past purposeful quit attempts and 76% reported incidental quit attempts. Over the 6 month follow-up period, 49% of participants reported a purposeful quit attempt and 38% an incidental quit attempt. Baseline predictors, including demographics, prior quit attempts, smoking variables (daily smoking status, dependence), and quit motivation variables, were examined in relation to the occurrence of quit attempts during the follow-up period. The occurrence of an incidental quit attempt was predicted by a smaller proportion of friends who smoke and lower desire and importance of quitting. Intentional quit attempts were predicted by being male and reporting a greater desire to quit. Conclusions: College students engage in frequent quit attempts, whether motivated by a desire to stop smoking or consequent to external contingencies. Although participants more often reported incidental than purposeful quit attempts at baseline, a greater proportion reported purposeful than incidental cessation efforts during the follow-up period. Few baseline predictors of cessation efforts emerged. The present results indicate that college students frequently attempt purposeful cessation

from cigarettes, regardless of the extent of their cigarette involvement. The present results highlight the value of providing resources and programs to assist college student smoking cessation efforts.

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Study of Tobacco Use among South Asian Young Adults (SSAYA)

According to the 2010 census, South Asians (SA) constitute the fastest growing Asian-American group with the number of Bangladeshis and Pakistanis doubling in size over the last ten years and similar growth patterns for Indians and other SA subgroups. While high tobacco use has been documented among SAs in their countries of origin, relatively little is known about tobacco use among young SA adults in the U.S. The Study of Tobacco Use among South Asian Young Adults (SSAYA) is a community-academic partnership with the goal of assessing patterns of tobacco use and related cultural, social, environmental and intrapersonal factors to inform future cessation strategy development. Two male and two female focus groups (n=16) were conducted in Los Angeles and Orange counties in both community and college campus settings with Bangladeshi, Indian, Pakistani, and Nepali young adult tobacco users from 18 to 29 years of age. Focus group findings will inform the development of a comprehensive tobacco use questionnaire to be administered to SA young adults across Southern California. Analysis of the focus group data revealed a number of informative themes. In terms of tobacco use, cigarette smoking is perceived as widespread among young SA males but not females, who report frequent hookah use; smokeless tobacco use is rare. Cigarette smoking and hookah are strongly linked to social influences for both genders and binge smoking among males is driven by social interaction. Despite a strong tobacco use cultural norm within the SA community, tobacco use is discouraged for young adult males and unacceptable for females. While young adult males generally disapprove of female cigarette smoking they are more accepting of female hookah use. Intrapersonal factors that contribute to tobacco use include stress relief and relaxation, focus to keep up grades, being cool, and dealing with nicotine dependence. Environmental factors that discourage cigarette smoking include public bans and family prohibition, while the presence of hookah bars promote use. Although the SA sample was well aware of the hazards of cigarette smoking, they were largely unaware of or misinformed about the harmful health effects of hookah, which appears to be growing in popularity. Regarding quit attempts, cigarette smokers reported difficulty quitting due to carving and the social nature of smoking. Hookah smokers did not feel the need to quit and generally do not consider themselves to be smokers or addicted to tobacco. Together, these findings shed light on important pro- and anti-tobacco use issues, which will be instructive in our survey development and future education and cessation strategy development for young adult SAs.

Danielle Ramo

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Marijuana and Tobacco Co-use in Young Adults: Implications for Dependence and Motivation to Quit

Among young adults, tobacco (TOB) and marijuana (MJ) use have been found to co-occur; yet the implications of their co-use are not well understood. The current study examined whether concurrent MJ use is associated with greater nicotine dependence and lower motivations to quit tobacco. Among young adults identified as co-users, we further aimed to examine patterns of co-use and thoughts about abstinence for both substances. Methods: Young adults age 18 to 25 (N = 1987) across the US who had smoked at least one cigarette in the past month completed an online survey anonymously. More than half (53%) had used MJ in the past 30 days. Propensity scoring was used to account for differences in TOB/MJ and TOB-only groups in multiple regression analyses. Results: Compared to TOB-only users, TOB/MJ co-users reported lower nicotine dependence (FTND score; B= -.11, p=.047); the number of cigarettes per day, days smoking in the past 30, and the likelihood of a past year quit attempt, however, did not differ significantly (p-values >0.5). Compared to TOB-only users, TOB/MJ co-users reported a greater commitment to total abstinence from tobacco use (OR = 1.64, 95% C.I.: 1.13, 2.27). Measures of stage of change for quitting tobacco and thoughts about tobacco abstinence (desire to quit, perceived difficulty with quitting, expected success with quitting) did not differ by group (p-values >.05). Among TOB/MJ co-users (n=1053), co-use occurred on average nearly half (49%) of days using. Age of first MJ use was significantly positively correlated with age of first use (r = .53, p < .001) and regular use (r = .34, p < .001) of TOB. Controlling for alcohol intake, there was a significant relationship between past 30 day TOB and MJ use (B=.24, p < .001), but no relationship between measures of nicotine and MJ dependence or number of past year quit attempts. TOB and MJ measures of desire to quit (r = .19, p < .001), expected success with quitting (r = .15, p

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Acculturation-related Risk Factors of Low-level and Intermittent Smoking among Latinos in California

RATIONALE: Cigarette smoking is the most preventable cause of death in the U.S. While Latinos smoke at lower rates than non-Latino Whites and Blacks, patterns of cigarette smoking differ among Latino subtypes. California Health Interview Survey (CHIS) data were used to characterize low-level (1-5 cigarettes per day (CPD)) and intermittent (not daily) smokers and identify risk factors of low-level and intermittent smoking among Latinos. METHODS: CHIS is a random-digit-dial telephone survey, conducted biannually, examining the health of Californians. This analysis includes 8,307 Latinos from nine ethnic groups who completed interviews in 2009. Smokers were identified as participants who smoked at least 100 cigarettes in their lifetime. Current smokers who smoked 1-5 CPD were categorized as low-level smokers. Intermittent smokers were comprised of current smokers reporting smoking some

days. Acculturation-related measures assessed included percentage of life in U.S., language spoken with friends, and language preference watching TV, listening to radio, and reading newspapers. Odds ratios and 95% confidence intervals (CI) were calculated using multiple logistic regression. Sample weights were specified to account for the survey design. RESULTS: Mean age was 45 years; 60% were female. 78% self-identified as Mexican, 9% as Central American (CA), 3.5% as Latino European (LE), 3% as South American (SA), and 1% as Puerto Rican (PR). 57% were foreign-born. Median household income was $29,000 and 60% reported a twelfth grade education or lower. 45% of men and 21% of women reported ever smoking.

John Shields, Education, Training & Research Associates

Glassman, Jill; Franks, Heather; Buchting, Francisco, Education, Training & Research Associates, San Francisco

Prevalence of Tobacco-use by LGBTQ youth in San Francisco from 2001-2011

Relatively few studies have looked at rates of tobacco use by Lesbian, Gay, Bisexual, Transgender, and Questioning (LGBTQ) youth and even fewer studies have explored the factors that are associated with tobacco use in this significantly understudied, diverse, and hard to reach population. A handful of studies to date show that rates of tobacco use among lesbian, gay, and bisexual (LGB) youth are significantly higher than those of heterosexual (H) youth and that internal and external stressors often experienced by LGB youth – such as lack of family acceptance, school bullying, harassment and victimization – are related to observed disproportionality in tobacco use and other high-risk behaviors.

Yet very little has been published on tobacco use by LGB youth and nothing has been published on LGB youth of color. Furthermore, no research with representative samples has been published on tobacco use by transgender (T) youth, who, along with LGB and questioning (Q) youth, make up the full range of sexual minority youth as defined by policy makers and health-promotion practitioners and stakeholders in California – that is, LGBTQ youth.

This study, recently funded by TRDRP, is pooling existing data from a decade's worth of San Francisco Unified School District's (SFUSD's) High School Youth Risk Behavior Surveys (YRBS) to (1) examine rates of tobacco use by LGBTQ youth across basic socio-demographic categories – including sex, gender identity, and race/ethnicity – and (2) investigate a range of environmental/contextual factors and other health risk behaviors that may be associated with tobacco use among LGB youth. Data available from 2001, 2005, 2007, 2009 and 2011 will be combined to create a sample representative of all students attending high school in SFUSD in 2001-2011. Creating such a pooled dataset is critical for increasing the available sample size for analyzing tobacco utilization among the high-risk, understudied minority subgroup of youth identifying as LGBTQ.

This presentation will describe the steps necessary for pooling data from multiple cross-sectional 2-stage cluster samples designed to be representative in a given year. It will describe the "complex samples" methods necessary to ensure that statistics are representative, and accompanying standard errors correctly reflect actual sample sizes and sampling designs. Finally, it will present results describing the

prevalence of tobacco utilization among LGBTQ youth in SFUSD, and describe how the rates vary across gender and racial/ethnic categories for LGB youth. Implications for tailoring prevention and cessation efforts for these high risk populations will be discussed.

Claradina Soto, Institute for Health Promotion and Disease Prevention Research, University of Southern

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Traditional Tobacco Use among California American Indian Youth: An Unexpected Risk Factor for Cigarette Smoking

American Indian youth have a higher smoking prevalence than any other ethnic or racial group in the U.S. Previous researchers have speculated that knowledge and use of ceremonial tobacco use would be protective against commercial tobacco use; however, this has not yet been tested empirically. This study examines the associations of knowledge and use of natural tobacco (home-grown or wild) and/ or commercial tobacco (store bought) for ceremonial prayer/traditional reasons with smoking behavior (past-month or lifetime). We also examined whether these associations differed across gender or between urban and reservation youth. Methods: Cross-sectional data from 996 American Indian youth throughout California were collected with a 40-minute paper and pencil culturally-specific tobacco survey. Youth 13-19 years of age were recruited from 48 different tribal youth organizations and cultural events in rural and urban areas of northern and southern CA. Logistic regression was used for the analysis. Results: AI youth were more likely to report lifetime and past-month smoking if they had used commercial tobacco for ceremonial/traditional reasons (lifetime OR=6.65 (2.56-17.27), past-month OR=3.47 (1.61-7.49)), natural tobacco for ceremonial/traditional reasons (past-month OR=2.42 (1.35-4.36)), or both (natural & commercial tobacco) for ceremonial/traditional reasons (lifetime OR=3.33 (2.05-5.41), past-month OR=3.32 (2.04-5.40). There was a significant interaction with knowledge of ceremonial use of tobacco x gender on lifetime (OR=0.71 p=0.04) and past-month (OR=1.03 p=0.01) smoking. Additionally, the interaction of commercial tobacco use for ceremonial/traditional reasons x gender on lifetime smoking was significant (OR=0.91 p=0.03). Conclusions: Contrary to expectations, the use of any type of tobacco (natural, commercial, or both) for ceremonial/traditional reasons was a risk factor for recreational smoking among AI youth. Traditional tobacco messages to respect and preserve the use of sacred tobacco must be carefully executed so that AI youth understand the distinction between traditional and recreational use of tobacco, especially among boys who typically have a larger role in the sacred use of tobacco.

Shu-Hong Zhu, University of California, San Diego

Sharon Cummins, Sandra Hernandez, Helena Pelayo, Anthony Gamst, University of California, San Diego

Low Frequency Smoking Among Latinos

Over 70% of Latino smokers in California are low-frequency smokers (those who smoke non-daily or who smoke fewer than 5 cigarettes per day). Their smoking patterns do not fit the withdrawal-based

classical addiction theory. Little is known about how they keep their smoking levels so low or about what keeps them smoking at all. Low-frequency smoking is becoming more common throughout the state. An understanding of low-frequency patterns will form the basis of new intervention approaches. Through online and print media we are advertising the study and interviewing 120 Latino smokers by telephone, asking detailed questions about their smoking histories and habits over a two week period. Subjects are: California residents, 18 or older, Latino/Hispanic, speak English or Spanish, smoke at least one day per week, have smoked for at least 3 years, and are not planning to quit smoking during the study period. We are recruiting subjects from 4 groups: (1) non-daily smokers who have never smoked daily, (2) non-daily smokers who used to smoke daily, (3) daily smokers who smoke 5 or fewer cigarettes per day (CPD), and (4) daily smokers who smoke more than 5 CPD. Preliminary analysis (n = 93) indicates about 80% of non-daily smokers have the self-image of being a smoker, and 44% of them said smoking was a large part of my life. However, compared to daily smokers who smoke more than 5 CPD, they are much less likely to take cigarettes with them when they leave their home (59% vs. 95%). Those who smoke daily but smoke

NICOTINE DEPENDENCE

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Post-traumatic Growth and Smoking Among High Risk Youth

Objective: This project proposes to investigate the effect of positive psychological change Post-traumatic growth (PTG) on cigarette smoking among an ethnically diverse group of continuation high school students who have experienced a highly stressful/traumatic event. With an estimated 67% of youth having experienced at least one traumatic event by the age of 16, this type of experience may be a more important contributor to stress and tobacco (and other drug) use, than has been previously studied. This will be the first study to test the relationship between PTG and change in cigarette smoking over time, while simultaneously examining intrapersonal (e.g., coping, depression, positive affect) and interpersonal (e.g., family conflict, peer smoking) predictors of cigarette smoking among older adolescents. We will also examine whether coping acts through PTG to lower the frequency or likelihood of smoking cigarettes, or to assist non-smokers in remaining smoke-free. Lastly, we will examine if PTG acts as a moderator of the relationship between cigarette smoking and stress in adolescents who have experienced significant trauma. Methods: Participants were enrolled in a randomized controlled trial of a nationally recognized drug abuse prevention program, Project Towards No Drug Abuse (TND). A paper and pencil survey was/will be administered in one 50-minute classroom period at each of the data collection sessions (Waves 1 through 4). Students who provide consent but are absent the day of survey administration will be given the option to complete the survey by phone. Baseline data (Wave 1; n=1676) indicated that the sample comprises a racially and ethnically diverse group among which to examine the link between PTG and cigarette smoking: 64.3% Latino/Hispanic, 13.3% mixed ethnicity, 11.0% White, 5.1% African American, and 6.3% other ethnicity (not specified). The mean age of participants at Wave 1 was 16.8 (SD=0.93). At present, we are finishing collection of the Wave 3 follow-up data (October 2010 - December, 2011), which will provide data on PTG. With an estimated attrition

of 41% at Wave 3, we anticipate an analytic sample size of 841 students. Due to the nested structure of students within schools, analytical methods will include using multilevel models and calculating the intraclass correlations (ICCs) for the 30-day cigarette smoking outcome. All regression analyses will control for age, gender, SES, baseline smoking, peer smoking, and program condition. Results: Results of this study may help to fill gaps in the current literature as well as help to refine future intervention programs. Conclusions: Research on the specific factors, such as PTG, that discourage cigarette smoking in the aftermath of stressful/traumatic events may help to augment current interventions aimed at helping high-risk adolescents.

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Nicotine Receptor Up-Regulation in Menthol Cigarette Smokers

Background Roughly, a third of smokers use predominantly menthol flavored cigarettes. Compared to non-menthol cigarettes, menthol cigarettes lead to elevated serum nicotine levels and more difficulty quitting in standard treatment programs. Previous brain imaging studies of humans smokers demonstrate that smoking in general (without regard to cigarette type) leads to up-regulation of ß2-containing nicotinic acetylcholine receptors (nAChRs) compared to non-smokers and former smokers. We sought to verify up-regulation of nAChRs in smokers and to determine whether menthol cigarette usage results in greater nAChR up-regulation than non-menthol cigarette usage. Methods Participants underwent positron emission tomography (PET) scanning, using the radiotracer 2-[18F]fluoro-A-85380 (2-FA). 2-FA specific binding volume of distribution (VS/fP) was determined for five brain regions (thalamus, brainstem, cerebellum, prefrontal cortex, and corpus callosum), as measures of a4ß2* nAChR density. Results An overall test of VS/fP values across all brain regions revealed a between-group (smoker versus non-smoker) difference (MANCOVA; df = 5, 107; F = 20.4; P < 0.0005). Follow-up tests for individual brain regions revealed significant differences between groups for the prefrontal cortex, brainstem, cerebellum, and corpus callosum (ANCOVAs, all df's = 1, 113; F's = 15.0, 21.5, 21.1, and 8.9; P?s all < 0.0005, except for corpus callosum, where P < 0.005), but not for the thalamus (ANCOVA; df = 1, 114; F = 0.2, n.s.). For regions found significant in the preceding analysis, a4ß2* nAChR levels were 36 to 42% higher for smokers than non-smokers. In comparing menthol versus non-menthol smokers, the overall test revealed a significant between-group (menthol versus non-menthol) difference, (MANCOVA; df = 5, 56; F = 2.9; P < 0.05). Follow-up tests for individual brain regions revealed significant between-group differences for the brainstem, cerebellum, and corpus callosum (ANCOVAs, all df's = 1, 62; F's = 7.5, 9.2, and 7.5; all P's < 0.01), with menthol smokers having 21 to 28% higher nAChR density in these regions. Exploratory tests also revealed a significant decrease in nAChR density with increasing age across the total study sample (MANCOVA; df = 5, 107; F = 7.4; p < 0.0005). Discussion Nicotine exposure appears to be a primary determinant of nAChR up-regulation. Therefore, more severe up-regulation of nAChRs in menthol cigarette smokers suggests higher brain nicotine exposure in this group of smokers.

Study results provide additional information about the severity of menthol cigarette use, and may explain why these smokers have more trouble quitting in standard treatment programs.

Manoranjan Dsouz

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N-methyl-D-aspartate Receptors in the Nucleus Accumbens Regulate Nicotine Reinforcement and Nicotine-seeking Behavior in Rats

Objective: The objective of the present study was to understand the role of nucleus accumbens n-methyl-d-aspartate (NMDA) receptors in nicotine reinforcement and nicotine-seeking behavior. Background: The reinforcing effects of nicotine are partly mediated by glutamatergic neurotransmission in mesocorticolimbic nuclei such as the ventral tegmental area (VTA) and nucleus accumbens (NAc). Glutamatergic neurotransmission in the NAc and the VTA is mediated by several glutamatergic receptors, including the N-methyl-D-aspartate (NMDA) receptors. Nicotine increases glutamatergic neurotransmission in the VTA and previous work in our laboratory has shown that blockade of NMDA receptors in the VTA decreases nicotine self-administration. In addition, nicotine also increases glutamate levels in the NAc. However, little is known about the role of NMDA receptors in the NAc shell and core in nicotine intake and nicotine-seeking behavior. Experimental Methodology: The present study assessed the effects of bilateral administration of the competitive NMDA receptor antagonist LY235959 (0, 0.1, 1 & 10 ng/0.5 µl/side) into the NAc shell or core on intravenous nicotine self-administration, in separate cohorts of rats for each brain site. Additional groups of rats were used to assess the effects of the same microinjections on cue-induced reinstatement of nicotine seeking in rats, a putative model of relapse to smoking in humans. Results: LY235959 (10 ng/0.5 µl/side) microinjections into the NAc shell (n=7-8/group), but not the core (n=7-10/group), significantly increased nicotine self-administration under both fixed- and progressive-ratio schedules of reinforcement. Furthermore, LY235959 microinjections (10 ng/0.5 µl/side; n=8/group) into either the NAc core or shell significantly increased reinstatement of cue-induced nicotine-seeking behavior compared to reinstatement after vehicle administration, with the effects being more prounouced in the core. Discussion: Taken together, these data suggest that blockade of NMDA receptors in either the shell or core increases nicotine intake and/or nicotine-seeking behavior. NMDA receptors in the NAcc are predominantly located on cell bodies of inhibitory GABAergic neurons and a few of these neurons project to the VTA. Blockade of these NAc NMDA receptors diminishes the inhibitory output from the NAcc to the VTA. Therefore, a possible mechanism for the findings of the present study could be that blockade of NAc NMDA receptors decreases the inhibitory output from the NAc to the VTA, an action that ultimately leads to increased nicotine intake and nicotine-seeking behavior. Conclusion: NMDA-mediated glutamatergic transmission in the NAc shell and core critically regulates nicotine intake and nicotine-seeking behavior in rats.

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Neurobiology of Cigarette Craving in Adolescent Smokers

Adolescence is a key developmental period for smoking initiation. However, there is little known about brain function in adolescent smokers. The goal of this study was to characterize neurobiological substrates of cigarette cue-related craving in adolescent smokers. A sample of adolescent smokers and nonsmokers and adult comparison groups were presented with smoking-related videos while they underwent a functional magnetic imaging (fMRI) scan. Preliminary analyses suggest that adolescent smokers compared to nonsmokers elicited greater brain activation in mesolimbic dopamine circuitry during presentation of smoking-related videos; there were no group differences in response to nonsmoking-related (neutral) videos. Relative to adult smokers, adolescent smokers showed hyperactivation in these regions as well. Additionally, self-reported craving during the scan predicted neural activation on both adolescent and adult smokers. Collectively, these data suggest that neural systems that undergo significant brain maturation during adolescence are uniquely sensitive to smoking-related cues in adolescent smokers.

Kim Janda, The Scripps Research Institute

Leveraging Adjuvants for Improved Nicotine Vaccines

Cigarette smoking is considered to be the leading cause of preventable death in the United States. Yet, society continues to smoke and this has been linked to the addictive effects of nicotine, which alters the chemical balance of the brain, making it difficult for smokers to arrest behavior persistence. Contemporary smoking pharmacotherapies have shown minimal efficacy, hence, new modalities are needed in the quest for smoking cessation. Immunopharmacotherapy aims to use highly specific antibodies to sequester the drug in the bloodstream effectively limiting the amount that is able to reach the brain. Thus, if nicotine is unable to reach the central nervous system, a smoker will feel minimal pleasurable effects resulting in less risk of falling back into cigarette pattern abuse. In clinical trials, nicotine vaccines have shown efficacy, however, limitations have been seen due to an inability to produce sufficient antibody levels in the vast majority of vaccinated subjects. Hence, there is a need to engineer alternate vaccine formulations with improved immunogenicity. In our current research efforts we have validated two vaccine haptens, using both a constrained and unconstrained approach, with efficacy observed during self-administration behavioral models. Having these encouraging results has allowed us to both build upon, and explore alternative strategies to generate improved nicotine vaccine formulations. These include the use of bivalent and fully synthetic vaccines to generate synergistic cocktails able to increase the quantity, quality and maintenance of circulating antibodies against nicotine. Initial probing of immunogenicity of these new vaccines in a mouse model has been encouraging and behavioral testing is ongoing.

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Pharmacological Chaperoning of Nicotinic Acetylcholine Receptors Reduces the ER Stress Response

An apparent neuroprotective effect of nicotine is suggested by the inverse correlation between a person's history of tobacco use and susceptibility to Parkinson's disease (PD). We tested whether intracellular pharmacological chaperoning of nicotinic receptors (nAChRs) affects the endoplasmic reticulum (ER) stress/unfolded protein response (UPR). Transient expression of alpha4beta2 nicotinic receptors (nAChRs) in Neuro-2a cells induced the nuclear translocation of fluorescent protein (FP)-tagged activating translocation factor 6 (ATF6-eGFP). Cells were exposed for 48 hr to either the full agonist nicotine, the partial agonist cytisine, or the competitive antagonist dihydro-beta-erythroidine. In the presence of co-expressed alpha4beta2 receptors, each ligand attenuated nuclear ATF6-eGFP translocation. Nicotine also attenuated endogenously expressed ATF6 translocation and phosphorylation of eukaryotic initiation factor 2alpha (peIF2alpha) in mouse cortical neurons transfected with FP-tagged alpha4beta2 nAChRs. Ligand-induced UPR inhibition correlated with increased ER exit sites. However, we found no correlation among the three ligands for other tested parameters: changes in nAChR stoichiometry ((alpha4)2(beta2)3 vs (alpha4)3(beta2)2), changes in ER and trans-Golgi structure, or degree of nAChR upregulation at the plasma membrane. Expression of constitutively upregulated mutant alpha4beta2(enhanced-ER-export) nAChRs also lowered ER stress, even in the absence of ligands. Activation of the nAChR channel did not underlie the reduced ER stress, which occurred with 0.1 µM nicotine (approximately the level during tobacco use) or cytisine; these concentrations respectively activate ~0.4% and

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Activation of Metabotropic Glutamate Receptor 7 (mGluR7) by AMN082 Attenuates the Rewarding Effects of Cocaine and Nicotine in Rats

The metabotropic glutamate receptor 7 (mGluR7) has received much attention as a potential target for the treatment of epilepsy, depression, anxiety and, most recently, drug dependence. In the present study, we investigated the role of mGluR7 in cocaine and nicotine reward based upon our previous findings that activation of mGluR7 by the selective agonist AMN082 modulated glutamatergic neurotransmission in the nucleus accumbens (NAc), a critical reward-related brain region. The

intravenous self-administration rat procedure was applied to study the positive reinforcing and motivational effects of cocaine and nicotine. The results indicated that systemic administration of AMN082 (3, 10, 20 mg/kg, intraperitoneal [i.p.]) decreased cocaine self-administration under fixed ratio (FR) and progressive ratio (PR) schedules of reinforcement, indicating that AMN082 inhibited both the primary reinforcing and incentive motivational effects of cocaine. The same doses of AMN082 also significantly decreased nicotine self-administration under an FR schedule of reinforcement, suggesting a reduction in the primary reinforcing effects of nicotine. Most interestingly, 3 mg/kg AMN082, a dose that did not induce a statistically significant reduction in cocaine self-administration under an FR2 schedule of reinforcement, significantly inhibited nicotine self-administration under an FR5 schedule. A plausible explanation for the increased sensitivity of nicotine self-administration, relative to cocaine self-administration, to the effects of AMN082 is that because both mGluR7 and nicotinic acetylcholine receptors (nAChRs) are located on glutamatergic neurons in the ventral tegmental area (VTA), the interaction between mGluR7 and nAChRs activation may be more direct and effective than interactions between mGluR7 and the primary sites of action of cocaine (i.e., monoamine transporters). Importantly, AMN082 did not affect sucrose consumption at doses that exhibited effectiveness in models of drug dependence in rats, suggesting that AMN082 has no effects on the rewarding properties of non-drug reinforcers. These findings suggest that mGluR7 may be a promising target for the treatment of cocaine and nicotine dependence with few undesirable side-effects.

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Mice Null for the Metabotropic Glutamate Receptor 7 (mGluR7) Exhibit Attenuated Brain Reward Deficits induced by Cocaine and Nicotine Withdrawal and Decreased Somatic Signs of Nicotine Withdrawal

Glutamatergic neurotransmission is critically involved in the reinforcing effects of nicotine and cocaine. However, little is known about the involvement of the metabotropic glutamate receptor 7 (mGluR7) in nicotine and cocaine dependence and withdrawal. mGluR7s negatively modulate glutamate transmission as inhibitory autoreceptors on glutamatergic neurons. The present study aimed to assess the role of mGluR7 in the anhedonic aspects of the nicotine and cocaine withdrawal syndromes and somatic signs of nicotine withdrawal using mGluR7 knockout (mGluR7-/-) and wildtype (mGluR7+/+) mice. The anhedonic aspects of withdrawal were assessed with brain reward thresholds derived from the intracranial self-stimulation (ICSS) procedure. Brain reward thresholds and somatic signs were assessed after the induction of withdrawal by cessation of administration of 90 mg/kg/day cocaine (salt)/saline administration for 3 days (IP) or 40 mg/kg/day nicotine (base)/saline administration for 28 days (SC) delivered via osmotic minipumps. Cocaine-withdrawing mGluR7-/- mice demonstrated similar threshold elevations as mGluR7+/+ mice from 3-12 h post-pump removal. At 24 h post-pump removal, thresholds of cocaine-withdrawing mGluR7-/- mice returned to baseline levels, while thresholds of mGluR7+/+ mice remained significantly elevated compared to thresholds of saline-treated mGluR7+/+ mice until 100 h post-pump removal. A similar pattern of threshold elevations and return to baseline levels was seen during nicotine withdrawal for the mGluR7-/- and mGluR7+/+ mice. Specifically, the

magnitude of threshold elevations was similar in nicotine-withdrawing mGluR7-/- and mGluR7+/+ mice 3 - 12 h post-pump removal. At 24 h post-pump removal, thresholds of nicotine-withdrawing mGluR7+/+ were elevated compared to thresholds of saline-treated mGluR7+/+ mice, whereas thresholds of mGluR7-/- mice returned to baseline levels. Increases in somatic signs were attenuated at 24 h post-pump removal in nicotine-withdrawing mGluR7-/- compared to mGluR7+/+ mice. These results demonstrated that the anhedonic aspects of the cocaine and nicotine withdrawal syndromes, as well as the somatic aspects of nicotine withdrawal, were attenuated in mGluR7-/- mice compared to wildtype mice. This attenuation of withdrawal signs in mGluR7-/- mice may result from the lack of adaptations in mGluR7 function that cocaine/nicotine administration may induce in mGluR7+/+ mice. Thus, these data suggest involvement of mGluR7 in the development of nicotine and cocaine dependence, the anhedonic aspects of cocaine and nicotine withdrawal and somatic signs of nicotine withdrawal.

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Role of the Alpha 2 Nicotinic Acetylcholine Receptor Subunit in Nicotine Reinforcement and Withdrawal

BACKGROUND: Neuronal nicotinic acetylcholine receptors (nAChRs) are pentameric ligand gated ion channels comprised of homomeric alpha (a7, a9) or heteromeric alpha (a2-7, a9, a10) and beta (ß2-4) subunits. Genome wide associations studies in humans have found polymorphisms in a number of nAChR genes, which are correlated with tobacco addiction as well as related disorders, such as lung cancer. Significant evidence highlights the Chrna5 Chrna3 Chrnb4 gene cluster and its association with tobacco addiction, while additional candidate gene studies have suggested a role for polymorphisms in the a2 nAChR (Chrna2) subunit gene with tobacco addiction as well as general drug dependence. Using a Chrna2 null mutant mouse, we asked if a2*-containing nAChRs play a role in nicotine reinforcement and withdrawal behaviors. METHODS: For nicotine reinforcement experiments, mice were trained to lever press for food using an escalating schedule of reinforcement (fixed ratio, FR 1 to 5). Subsequently, mice were tested for intravenous nicotine (0.03 mg/kg/infusion) self-administration at a FR5 schedule for one week and evaluated on a nicotine dose response curve (0, 0.01, 0.03, 0.1, 0.4 mg/kg/infusion). For nicotine withdrawal studies, mice were administered nicotine for two weeks at 24 mg/kg/day via an Alzet osmotic minipump. On the 13th day of nicotine exposure, animals were placed into a novel environment, habituated for 40 min, administered mecamylamine (3 mg/kg, i.p.) and evaluated for somatic symptoms of withdrawal for an additional 20 min. Two hours post-withdrawal assessment, animals were sacrificed, the interpeduncular nucleus (IPN) dissected (a primary brain region expressing a2 nAChR transcripts), and neurotransmitter levels quantified using high performance liquid chromatography coupled with electrochemical detection. RESULTS: For nicotine reinforcement experiments, there was no significant difference between wild-type and Chrna2 null mutant mice during either food or nicotine self-administration. For nicotine withdrawal experiments, when quantifying

somatic withdrawal signs (paw tremors, head-shakes, backing and curls) our results showed that both wild-type and Chrna2 null mutant mice exhibit significant enhancement (versus saline) of mecamylamine precipitated somatic withdrawal scores. When we quantified other somatic behaviors (grooming, scratching, chewing, cage scratching, head nodding, and jumping), we observed suppression of behavior in wild-type mice, which failed to reach statistical significance in the Chrna2 null mutant mice. The combined findings suggest that a2*-containing nAChRs do not influence nicotine reinforcement behavior and likely have more subtle involvements in aversive somatic withdrawal than previously thought. Given the high level of a2 nAChR transcripts in the IPN, we tested whether altered neurotransmitter levels (dopamine, norepinephrine, serotonin) in the IPN could be responsible for the subtle genotype dependent differences in nicotine withdrawal. While no genotype specific effects were observed, our results demonstrated that mecamylamine-induced withdrawal assessment in nicotine treated mice disrupted the relationship between IPN tissue levels of dopamine, norepinephrine, and serotonin in predicting somatic withdrawal (paw tremors, head-shakes, backing and curls). DISCUSSION: Taken together, our results suggest that a2*-containing nAChRs do not play a discernable role in nicotine reinforcement and have more subtle involvements in aversive somatic withdrawal, depending on how the assay is performed and analyzed. We speculate that other nAChRs within the IPN are involved in the disruption of neurotransmitter function in mediating nicotine withdrawal symptoms.

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Lynx1 Dosage Modulates Nicotinic Acetylcholine Receptor Action to Optimize Cholinergic Tone in the Brain

Maintenance of the level and function of nicotinic acetylcholine receptors (nAChRs) during development and adulthood is essential for proper circuit function. Substantial evidence exists that the cholinergic system exists along a gradient of activation, with low levels of cholinergic activation being associated with poor memory performance and dementias, whereas on the other extreme, over-activation of the cholinergic system can lead to some forms of epilepsy, addictions, and even neurodegeneration. The action of lynx1, a prototoxin with structural similarity to a-bungarotoxin, act as a molecular brake over nAChRs, and manifests itself at both circuit and network levels on nicotinic systems. Removal of lynx1 can lead to nAChR hypersensitivity larger direct nicotinic responses, slowed desensitization kinetics, and enhanced sensitivity to nicotine. As a consequence of nAChR hypersensitivity, lynx1 knockout (KO) mice display improved learning and memory functions. Aging lynx1KO mice, however, demonstrate a vacuolating degeneration that is ameliorated by crossing to ß2 nAChR KO and a7 nAChR KO mice. These data show that lynx1 exists, genetically, as an upstream modulator of nicotinic receptor function and indicated that lynx modulation and can exert top-down control over cholinergic dependent processes. Here, we have undertaken a dose analysis of the lynx gene, and have determined that partial removal of lynx results in greater learning than complete lynx removal in several learning and memory paradigms. Interestingly, the degenerative phenotype found in aging lynx1 homozygous KO mice is not observed in mice with partial removal of lynx1 levels. These data indicate that optimized levels of cholinergic

activity- termed cholinergic tone- can be regulated by titrating lynx dosage. Together, this suggests that lynx moderates plasticity and learning in the brain in order to prevent over-activation of nAChR that can leave neurons susceptible to neurodegeneration.

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Chronic Nicotine Exposure Depresses Dopamine Release in Nonhuman Primate Nucleus Accumbens

Tobacco use is a leading cause of preventable deaths worldwide. However, current smoking cessation therapies have only very limited long-term success rates. Considerable research effort is therefore focused on identification of CNS changes with nicotine exposure as this may lead to more successful treatment options. Recent work suggests that a6ß2* nAChRs play a dominant role in dopaminergic function in rodent nucleus accumbens; however, the effects of chronic nicotine exposure remain to be determined. The objective of our study was to investigate a6ß2* nAChR-mediated release with chronic nicotine treatment in nonhuman primate nucleus accumbens shell, a brain region that plays a critical role in nicotine addiction. To approach this we used cyclic voltammetry, a technique which offers the advantage that it measures electrically evoked dopamine release in real time under different neuronal firing conditions. Control studies showed that nAChR-mediated dopamine release occurs predominantly through the a6ß2* receptor subtype. Unexpectedly, several months of nicotine treatment abolished the effects of nAChR antagonists on dopamine release, suggesting a complete loss of 6ß2* nAChR-mediated activity. However, acute nicotine application still affected release in slices from nicotine-treated animals, albeit to a lesser extent than in vehicle-treated animals. Thus, a6ß2* nAChRs appear still partially functional after chronic nicotine dosing. Additional experiments show that nicotine-evoked [3H]-dopamine release from nucleus accumbens synaptosomes was similar in nicotine and vehicle-treated monkeys, indicating that long-term nicotine administration does not directly modify a6ß2* nAChR-mediated dopamine release. Dopamine uptake rates, as well as dopamine transporter and a6ß2* nAChRs levels were not changed with nicotine administration. These data indicate that nicotine exposure, as occurs with smoking, has major effects on multiple cellular and/or molecular mechanisms linked to a6ß2* nAChR-mediated dopamine release. Furthermore, they suggest that the a6ß2* nAChR subtype may represent a novel therapeutic target for smoking cessation.

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Brain Reward Function in Response to Nicotine, Nicotine Withdrawal and Atomextine Treatment in Rats with Different Levels of Inhibitory Control

Inhibitory control deficit, a form of motor impulsivity, has been implicated in tobacco smoking. Both nicotine dependence and impulsivity have been linked to decreased norepinephrine (NE)

neurotransmission. The present work investigated whether trait impulsivity may influence sensitivity to the reward enhancing effects of nicotine and/or affective aspects of nicotine withdrawal. We also investigated whether atomoxetine, a NE reuptake blocker that increases NE transmission and decreases impulsivity, reverses the affective and somatic aspects of nicotine withdrawal in rats with different impulsivity levels. Rats were selected from the top and bottom 25% of the population for high (HI) and low (LI) levels of inhibitory control, as measured by premature responses in the 5-choice serial reaction time task. Rats prepared with electrodes in the lateral hypothalamus were trained in the intracranial self-stimulation procedure. Brain reward function (reward thresholds) and inhibitory control (timeout responses) were accessed in response to acute nicotine, chronic nicotine administered via osmotic minipumps (6.31 mg/kg/day base) and nicotine withdrawal. Somatic signs of nicotine withdrawal were also observed. Chronic atomoxetine treatment via minipump (2 mg/kg/day, salt) began after 7 days of nicotine/saline exposure and continued during administration of nicotine/saline for 14 days and during nicotine/saline withdrawal. Acute nicotine induced threshold lowering in HI rats to a lesser extent than in LI rats, and decreased responding during timeout period in HI, but not LI rats. Chronic nicotine exposure had no effect on reward thresholds in HI and LI rats. During nicotine withdrawal, the threshold elevations were similar in HI and LI rats, but somatic signs of withdrawal were diminished in HI compared to LI rats. Chronic atomoxetine prevented increases in somatic signs, but had no effect of threshold elevations during nicotine withdrawal in HI and LI rats. The results suggest that poor inhibitory control results in diminished sensitivity to nicotine-induced reward enhancement and somatic aspects of nicotine withdrawal. Acute nicotine improved inhibitory control in HI rats; while had no effect in LI rats. Diminished responsiveness to the effects of nicotine and nicotine withdrawal and beneficial effects of nicotine on inhibitory control may promote nicotine dependence in smokers with inhibitory control deficits. Pharmacological treatments that increase NE transmission may be effective antismoking aids for physical aspects of nicotine withdrawal in all smokers independent of impulsivity levels.

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Nicotine Delivery to Rodents via Lung Alveolar Region-targeted Aerosol Technology Produces Blood Pharmacokinetics Resembling Human Smoking

Nicotine is one of the most heavily used addictive drugs. Smokers and bystanders are exposed to nicotine via burning of tobacco. Nicotine in cigarette smoke is deposited and absorbed in the lungs leading to a rapid increase in arterial blood nicotine concentrations and gets into the brain within 8-10 s. The high-arterial-peak concentration pattern of nicotine pharmacokinetics plays an important role in development of dependence. There is no animal model for nicotine exposure that resembles the pharmacokinetics of human smokers. We developed a system for delivering nicotine to rodents using alveolar region-targeted aerosol technology. We generated nicotine aerosol with 1% nicotine solution (pH 8.0) using a 3-jet Collison nebulizer. We determined, using an aerodynamic particle sizer (APS), the aerosol droplet size distribution with a mass median aerodynamic diameter (MMAD) = 2.1 μm and a

geometric standard deviation (GSD) = 2.85 which was within the range of respirable diameter. Rats were exposed to nicotine aerosol in a nose-only exposure chamber for 2 min; arterial blood nicotine concentrations reached 43.2 ± 15.7 ng/mL (mean ± SD) within 1-4 min and declined over the next 20 min, the magnitude and kinetic pattern closely mimic those of human smoking a cigarette. The venous blood nicotine kinetics was also similar to smokers. These results suggest that nicotine droplets get into the alveolar regions and are quickly absorbed into circulation. By varying the parameters for nicotine aerosol generation, we induced seizures and caused death in adult rats suggesting substantial amounts of nicotine can be delivered via the inhalation/aerosol route. We determined the acute inhalation toxicity of nicotine, i.e., the LC50 (defined as nicotine concentration in air that causes death in 50% animals exposed for a specified duration) = 2.3 mg/L (rat, 20min). Using a free-moving exposure system, we observed concentration dependent nicotine induced seizures in rats and mice. In conclusion, we developed a non-invasive method and devices delivering nicotine to rodents that ensures rapid delivery of adequate and controllable amounts of nicotine into the circulation and brain. This method produces blood nicotine kinetics resembling human smoking a cigarette, and induces dose-dependent pharmacological effects in rodents. This method can be readily used for chronic nicotine exposure. The method provides a powerful tool for studies of nicotine addiction, toxicology, tobacco-related diseases as well as, if applied to pregnant rodents, nicotine teratogenicity, and ultimately, for discovery of pharmacological therapeutics.

Scientific Abstracts

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HOW SMOKING CAUSES DISEASE

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Towards a New Biomarker of HDL Functionality for Cardiovascular Disease Risk Assessment in Smokers

High plasma levels of high density lipoprotein-cholesterol (HDL-C) are an established marker of cardiovascular health. However, to improve assessment of cardiovascular disease (CVD) risk, new clinical methods for evaluating HDL functionality rather than just cholesterol content are needed. Apolipoprotein A-I (apoA-I) is the main protein component of HDL; in fact, the large majority of plasma apoA-I is HDL-associated. However, lipid-poor/lipid-free apoA-I, not HDL, is the main extracellular recipient of cellular cholesterol. We hypothesized that apoA-I's ability to transition from the HDL-associated to the lipid-free/lipid-poor state (apoA-I's exchangeability) is critical for apoA-I's efficiency in activating cellular cholesterol release in vivo. By using a fluorescence resonance energy transfer (FRET) apoA-I variant as a sensor of apoA-I's lipidation state, we demonstrated in vitro that apoA-I's exchangeability is impaired by crosslinking or oxidative reactions similar to those occurring in atherosclerosis (Cavigiolio et al., J. Biol. Chem. 2010). However, this assay is not suitable for clinical samples because of the background interference of naturally occurring fluorophores. Here we report the development of a new bioassay for clinical samples analysis. FRET-donor and acceptor fluorophores that are unaffected by other biomolecules fluorescence can be introduced into apoA-I by producing the N- and C- termini separately. The C-terminus was generated by chemical cleavage of a full-length variant. The N-terminus was obtained by self-cleavage of an intein-fusion protein and labeled with the FRET-donor. After express chemical ligation of the two termini, the resulting cysteine at the point of ligation will be labeled with the FRET-acceptor. By using this new FRET-probe we will test the hypothesis that apoA-I's exchangeability is reduced in HDL from smokers (high risk of CVD) and patients with history of CVD. This new marker of HDL functionality will guarantee non-invasive early stage identification of smokers at high risk of CVD. Better CVD risk prediction in smokers would allow early referral to smoke cessation programs and early therapeutic interventions, greatly reducing the morbidity of this deleterious behavior.

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Increased Susceptibility of Infant Airway Epithelium to Viruses and Bacteria Following Tobacco Smoke Exposure

RATIONALE: Cigarette smoke exposure significantly increases the risk of respiratory infections, with higher incidence, enhanced severity and longer duration of respiratory illnesses reported in smokers and

those exposed to second hand smoke. The mechanism(s) by which cigarette smoke increases infection susceptibility and impairs host immunity is unclear. Young children may be more sensitive to the effects of environmental tobacco smoke (ETS) as the first year of life represents a highly dynamic developmental phase for both the respiratory and immune systems. Many consider this a window of susceptibility? for modulation by the environment, as postnatal toxicant exposure has the potential to permanently affect the overall growth and function of the respiratory system. METHODS: To investigate the impact of ETS on mucosal immune responses and susceptibility to respiratory pathogens during early childhood, we developed an ex vivo cigarette smoke exposure and microbial challenge model with bacterial lipopolysaccharide (LPS) and pandemic H1N1 influenza virus. Tracheal explants composed of an intact epithelial mesenchymal trophic unit from infant.

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Altered Flow Mediated Dilation in Young Adults Caused by Cigarette Smoking

PURPOSE: Previous studies have suggested endothelial dysfunction as a predictor of adverse cardiovascular events, and cigarette smoking impairs endothelial function. To examine the degree to which smoking cigarettes affects endothelial function in individuals, we compared brachial artery flow-mediated dilation (FMD) between young adult smokers (100 cigarette lifetime minimum, and 15 per month) and non-smoking recreationally-active young adults. METHODS: The FMD test was performed on 30 young adult smokers (26 M, 4 F, age 25.2±4.6yrs) and 37 non-smokers (23 M, 14 F age 22.5±3.4yrs). Parameters of the FMD test include, baseline and peak diameter, FMD (% and absolute change), shear rate area under the curve (s-1, AUC), normalized FMD response (FMD (%) / Shear rate (s-1, AUC). Normalized FMD response removes the influence of shear stress caused by differences between smokers and non-smokers in shear rate and diameter. Smoking status was verified via breath carbon monoxide (CO) concentration. RESULTS: Normalized FMD response (0.41±0.35 vs. 0.77±0.49, p=0.001) is lower, while shear rate (14,000±9,000 s-1, AUC vs. 17,000±8,000 s-1, AUC p=0.04) is higher in smokers compared to non-smokers. Baseline diameter (0.38±0.06 cm vs. 0.41±0.06 cm p=0.01) and peak diameter (0.41±0.06 cm vs. 0.43±0.06 cm p=0.02) are greater in smokers than non-smokers. No differences (p>0.05) between smokers and non-smokers were observed for FMD (5.8±3.7% vs. 7.3±3.6%) and absolute change in diameter (0.03±0.01 cm vs. 0.02±0.01 cm). Further, there was no correlation with breath CO concentration and any FMD variable in smokers. CONCLUSION: These data support previous studies which indicate that chronic smoking results in endothelial dysfunction. Our ongoing randomized-controlled trial will determine if resistance training can improve endothelial function in chronic smokers and whether the levels after training will be similar to those in non-smokers before training.

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Third Hand Smoke Exposure Stimulates Hepatic Steatosis

It is widely known and accepted that cigarette smoke causes cancer and the evidence is clear for the health implications associated with second hand smoke exposure, but fewer people are aware of the adverse health effects associated with third hand smoke (THS) exposure. THS is a lesser-known type of tobacco smoke exposure that involves contact with the chemical residues left behind on people's skin, clothing, and surfaces of their home or automobile after exposure to cigarette smoke. THS contains a broad array of chemicals such as naphthalene, formaldehyde, and cresol to name a few; but it is the non-volatile nicotine that shows the greatest propensity to build on surfaces and the highly carcinogenic tobacco-specific nitrosamines that present the most concern. A number of recent publications have indicated the presence of these chemicals in the homes of smokers and exposure assessment studies have revealed chemical assimilation in those living in the contaminated house. However, the consequences of exposure have yet to be elucidated. The research presented here focuses on THS exposure and its impact on liver function. By employing a novel method that mimics exposure to THS, we investigate the health effects of THS in vivo, helping to bridge the knowledge gap between exposure and risk assessment. We and others have shown that exposure to, first- and second-hand smoke leads to non-alcoholic fatty liver disease (NAFLD) and our new data suggest that THS may also contribute to NAFLD. Urine and liver samples were collected from mice exposed to THS for 28 weeks and analyzed. Liquid chromatography-tandem mass spectroscopy yielded urinary concentrations of two metabolites specific to nicotine and NNK metabolism, cotinine and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL) respectively, indicating assimilation of both chemicals from THS exposure. Histological analysis of livers from mice exposed to THS show increased vacuolization and lipid accumulation, an indication of NAFLD. In addition, DNA microarray data reveal changes induced by THS in the expression of genes integral to chemical detoxification and lipid metabolism and transport in the liver. Enzymes required for fatty acid oxidation and breakdown, such as acyl-coA dehydrogenase, carnitine transferase, and all 4 beta oxidative enzymes were > 2 fold down-regulated when compared to control mice. In an hepatocyte, these changes would result in a dramatic decrease in lipid processing and clearance, which is a likely mechanism behind THS-induced hepatic steatosis. Our findings indicate that THS exposure can result in hepatic steatosis mediated through changes in gene expression responsible for proper fat metabolism and transport in the liver. By elucidating the health implications of THS, we will be better equipped to determine the risk associated with THS exposure, in particular for children and the elderly, which will be paramount in the development and establishment of indoor non-smoking policies helping to prevent exposure and improve public health.

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THS and its Effects on Physiology and Healing

Third Hand Smoke (THS) is derived from the accumulation of tobacco toxins from second hand smoke (SHS) on environmental surfaces. Currently, there is little understanding in the population that THS is a danger to their health. Skin, the largest organ in the body, performs many important functions and it is directly exposed to THS toxins by contact with contaminated surfaces. Toxins from THS are adsorbed/absorbed by the skin, enter the blood stream, and circulate to the various organs eventually being excreted in the urine. Over time this can be problematic causing cell dysfunction and perturbing the normal healing of cutaneous wounds as well as the healing of damage to internal organs. Furthermore, THS toxins may cause microvessel constriction, preventing oxygen and nutrients from reaching the tissues and potentially leading to cell death. It is also very important that the THS toxins can kill immune-surveillance cells, such as specialized macrophages and histiocytes. By studying the effects of THS on the temporal and special events of wound healing, it is possible to deduce where the toxins of THS have the major impact on cell and tissue function. The purpose of this study is to determine the effects of THS on the time and course of healing, morphology/immunohistochemistry of healing of the skin, as well as determining the effects of THS on the patterns of expression of cytokines and growth factors during the course of healing. We used wild-type C57Bl/6 mice and an exposure system that mimics the exposure environment experienced by people through life. The mice are exposed to THS by living for at least 9 months in cages containing carpet, curtain and upholstery material exposed to second-hand smoke (SHS), however the mice themselves are never exposed to SHS. Analysis of the urine of the exposed animals over time shows increased levels of nicotine, cotinine, and 4-(Methylnitrosamino)-1-(3-Pyridyl)-1-Butanol (NNAL), a metabolite of NNK (4-(Methylnitrosamino)-1-(3-Pyridyl)-1-Butanone) which is a carcinogen present in tobacco, indicating that the THS is being absorbed by the skin and potentially also ingested. Wound healing experiments performed on the skin of these mice show that the healing in these mice is abnormal. It occurs with strong contraction indicating the presence of excess numbers of myofibroblasts that produce excess extracellular molecules, in particular, Collagen I, potentially leading to severe scarring. We have also found that expression of genes involved in response to injury is altered and the levels of pro-inflammatory chemokines/cytokines are increased. Analysis of organs that can be exposed to THS through breathing (lung), detoxification (liver), licking (tongue), eating (esophagus and intestine) and also looking at the immune cells in the spleen are under way. We have already found that the liver contains excess lipid accumulation indicating the presence of non-alcoholic fatty liver disease (NAFLD), and that the alveoli of the lung are enlarged. We have also found that these animals appear to have altered behavior when in their cages. When people are informed about the consequences of THS, specifically related to health problems, they are more likely to abide by non-smoking rules. However, without knowledge of THS's negative effects, it is difficult for agencies to develop proper policies and to impose them. By

determining how THS affects health, better policies can be put in place to protect those who are exposed to this form of smoke, especially children, the elderly and those who have chronic diseases.

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A Thirdhand Smoke Constituent, Induces DNA Damage In Vitro and in Human Cells

Thirdhand smoke (THS) exposure is a potential new health risk as recent indoor chemistry studies have revealed that sorbed nicotine reacts with the common indoor pollutant nitrous acid (HONO) to form mutagenic tobacco-specific nitrosamines (TSNAs). 1-(N-methyl-N-nitrosamino)-1-(3-pyridinyl)-4-butanal (NNA) is the major TSNA product identified from THS and is absent in freshly emitted secondhand cigarette smoke. So far its potential to cause DNA damage or adduct formation has not been reported. In this study, we examined the genotoxicity of NNA in human hepatocellular carcinoma (HepG2) cells and the ability of NNA to form DNA adducts with 2-deoxyguanosine (dGuo) in vitro. Using the alkaline comet assay NNA was found to cause concentration-dependent DNA strand breaks in HepG2 cultures. These cells were exposed to NNA at non-cytotoxic concentrations ranging from 0.01 µM to 100 µM for 24 hours and the most dominant evidence of DNA damage was observed at low levels of NNA (0.01-1µM). In the reaction with dGuo in vitro, NNA produced a number of adducts and three of them are described here. Electrospray ionization mass spectrometry (ESI-MS), ESI-MS/MS and HPLC-UV were used to characterize and identify these adducts. The UV spectrum of Adduct 1 showed max246 nm, 288 nm and min270 nm, which are indicative of a N7-substituted dGuo, and the mass spectrum exhibited ions at m/z = 415, 437 and 321, corresponding to [M+H]+, [M+Na]+ and [(M-deoxyribose+H)+Na]+, respectively. Adduct 2 gave a UV max255 nm which is typical for a substitution at the N2 position of dGuo, and the mass spectrum was similar to that of Adduct 1. The UV spectrum of Adduct 3 showed ?max247 nm, 282 nm and ?min262 nm, which are characteristics of O6-substitution of dGuo, and the mass spectrum exhibited ions at m/z = 282, 304, 546 and 585 corresponding to [M+H)+, [M+Na]+, [2M-H2O+2H]+, and [2M+Na]+, respectively. MS/MS of the ion at m/z = 304 resulted in a fragment ion at m/z = 188, which corresponds to O6-methyl-dGuo. Mechanistically, the carbocation pathway may result in the formation of adducts 1 and 2, and adduct 3 could be formed from a diazonium ion reaction yielding O6-methyl-dGuo. In conclusion, these results provide evidence for DNA damaging potential of NNA, which, in part, may contribute to THS-induced adverse health effects in humans. In addition, the NNA-DNA adducts identified can be used as specific biomarkers of THS exposure.

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Fitness Levels in Smokers and Healthy Controls: Predictability by Carbon Monoxide and Fagerström Test

PURPOSE: Cigarette smoking affects human metabolism and exercise capacity, but these relationships are not fully understood. This study aims to compare: 1) cardiorespiratory fitness (CRF) and muscle strength in chronic smokers and recreationally-active, non-smoking young adults as part of a randomized-controlled trial to investigate the effects of resistance training on vascular function and; 2) the effectiveness of self-reported number of cigarettes smoked per day (CPD), Fagerström Test for Nicotine Dependence (FTND), and breath carbon monoxide (CO) levels to assess predictability of exercise capacity markers and arterial stiffness in young adult chronic smokers. ¬ METHODS: 26 young adult male smokers (age 25.1 ± 4.5 yr, BMI 25.4 ± 5.9) were assessed for breath CO concentration, CPD, and by FTND. Smokers and 25 non-smokers (age 23.8 ± 4.1 yr, BMI 24.5 ± 2.6) were assessed for CRF by VO2max, composite 1-repetition maximum (1RM) strength by bench press, leg press and machine row, and arterial stiffness by arterial tonometry. RESULTS: Smokers exhibited lower absolute (2.39 ± 0.49 vs. 2.97 ± 0.67 L/min, $p = 0.004$) and relative (29.1 ± 1.2 vs. 40.4 ± 2.0 ml/kg/min, $p < 0.0001$) VO2max and total (825 ± 39.5 vs. 989 ± 49.6 lbs, $p = 0.01$) and relative (4.6 ± 0.1 vs. 6.1 ± 1.0 lbs/lbs body weight, $p < 0.0001$) 1RM. CO was highly related to FTND ($R = 0.62$, $p = 0.0003$) and CPD ($R = 0.56$, $p = 0.0006$). CO significantly predicted total 1RM ($R = -0.51$, $p = 0.009$), Vco2 ($R = 0.55$, $p = 0.033$), subendocardial viability ratio ($R = 0.44$, $p = 0.02$), HRrest ($R = -0.39$, $p = 0.047$). FTND significantly predicted VTmax ($R = -0.46$, $p = 0.03$), aortic augmentation index ($R = -0.35$, $p = 0.048$), aortic systolic pressure ($R = 0.36$, $p = 0.03$), and central pulse height ($R = -0.35$, $p = 0.049$). Both CO and FTND predicted HRmax (CO: $R = -0.61$, $p = 0.007$; FTND: $R = -0.65$, $p = 0.036$) and VEmax (CO: $R = -0.52$, $p = 0.023$; FTND: $R = -0.50$, $p = 0.03$). CPD showed no significant predictions. CONCLUSION: Preliminary results suggest that cigarette smoking negatively impacts CRF and strength fitness in young adult males. Additionally, higher CO levels are associated with lower muscle strength. CO and FTND are associated with both complementary and unique indices of exercise capacity and vascular function, suggesting studies would benefit most from determining CO levels and administering FTND tests.

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A Baseline Assessment of Arterial Stiffness in Chronic Smokers Compared with Recreationally-Active, Young Adults

PURPOSE: Previous studies have demonstrated the beneficial effect of exercise on arterial stiffness, an independent predictor of cardiovascular disease risk, in healthy, young adults. However, the effects of exercise on chronic smokers are not known. The present study compared baseline arterial stiffness measurements between smoking and non-smoking, recreationally-active, young adults as part of a randomized-controlled trial (RCT) to investigate the effects of resistance training (RT) and smoking cessation on vascular function in young adult, chronic smokers. METHODS: Brachial blood pressure and arterial tonometry measurements were performed on 30 young adult smokers (26 men, 4 women, age

25 ± 4.6 yr) and 37 non-smokers (23 men, 14 women, age 23 ± 3.4 yr). Smokers reported the number of cigarettes smoked/day over the past 30 days. Arterial stiffness was assessed in duplicate via measurements of cfPWV and radial artery pulse wave analysis (PWA) using applanation tonometry (Sphygmocor) to derive augmentation index (AIx), sub-endocardial viability ratio (SEVR, an index of cardiac perfusion), pulse pressure amplification (PPA), and mean aortic pressure (aMAP). Results are reported as mean ± standard deviation. RESULTS: Despite no significant differences in brachial blood pressures, compared with healthy, recreationally-active control subjects, smokers exhibited higher cfPWV (6.6 ± 1.1 m/s vs. 5.8 ± 0.9 m/s, p < 5 cigarettes/day) smokers compared to more frequent smokers (> 6 cigarettes/day) (6.0 ± 0.9 m/s vs. 6.9 ± 1.1 m/s, p.

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Nicotine Inhibits Heart Valve Formation through Vegf Signaling

Smoking during pregnancy is a major risk factor of congenital heart disease. The objective of the study is to understand the mechanism by which maternal smoking causes congenital heart defects. Epidemiological studies indicate that maternal smoking is associated with heart valve malformations in newborns. To study whether the nicotine component in the tobacco causes heart valve defects, we used zebrafish, mouse embryos, whole embryo culture, heart explant culture, and molecular biology methods to determine the effects of nicotine on heart valve development and the downstream molecular pathway that may disturb valve formation. Our studies show that nicotine inhibits a cellular process termed endothelial-to-mesenchymal transformation (EMT), an essential process for the initiation of valve formation in the endocardial cushions of the developing mouse heart. In the endocardial cushion, nicotine inhibits the expression of the transcription factor Nfat (nuclear factor in activated T cells), which then represses the expression of Vegf-a (vascular endothelial growth factor). Therefore, endocardial cushions of the heart treated with nicotine display increased expression of Vegf-a, a potent inhibitor of EMT and valve formation. Inhibition of Vegf-a rescues the EMT defects in nicotine-treated endocardial cushions. Similarly, nicotine causes valve defects in zebrafish embryos, suggesting a evolutionary conservation of the nicotine-related pathway in valve development. Our studies thus demonstrate how nicotine exposure may cause endocardial cushion and heart valve defect in developing embryos. This provides an explanation at the molecular level for congenital heart defects associated with maternal smoking.

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Osteogenic Toxicity of Chewing Tobacco Correlates with Changes in ROS Production and Altered Levels of Beta-catenin

Tobacco smoke not only affects the health of an adult person, but can also have detrimental effects on the developing embryo. Recent studies have suggested that smoke from tobacco products has the ability to affect the development of the embryonic skeleton. In order to understand the mechanism of tobacco toxicity on normal embryonic bone development, we have begun to test tobacco products for their ability to interfere with the osteogenic differentiation of human embryonic stem cells (hESCs). We have successfully used an osteogenic medium that we had previously described for mouse ESCs, to induce differentiation of hESCs into osteoblasts. Osteogenic hESC cultures were positive for alkaline phosphatase, an enzyme usually found in pre-osteoblasts, they deposited calcium into their extracellular matrix and expressed mRNAs, such as Cbfa1 and osteopontin, which are typically associated with bone tissue. These cultures were further immunoreactive to an antibody for osteocalcin, which is unique to osteoblasts. We have then tested Camel Snus tobacco extract (STE) as well as mainstream (MS) and sidestream (SS) smoke form Marlboro Red 100 on osteogenically differentiating hESCs. We have found that MS smoke was not as potent in inhibiting osteogenic differentiation as SS smoke or STE. Calcification of hESCs treated with MS Marlboro Red100 at any concentration was slightly elevated than in non-treated cultures, while a decrease in calcification was detected for SS smoke from the same brand of cigarette. In summary, our first results provide proof-of-principle data that skeletal development may indeed be affected by tobacco products. We will also provide first evidence that tobacco products, specifically STE, interfere with the developmental process by influencing the level of cellular reactive oxygen species and alteration of the Wnt/beta-catenin pathway.

REGULATORY SCIENCES: BRIDGING THE GAP BETWEEN DISCOVERY & POLICY

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Tobacco Industry Political Strategies after the 1998 MSA

Historically, one of the major barriers to passing tobacco control legislation has been the political activity of tobacco firms and trade associations. The 1998 Master Settlement Agreement between 46 state Attorneys General and the major U.S. tobacco firms placed restrictions on tobacco industry activities in order to serve multiple goals, one of which was to restrict the political power of tobacco firms. This project provided a systematic evaluation of changes in tobacco firms' goals and activities in the wake of the 1998 MSA.

Although reports in the popular media suggest that tobacco firms at least occasionally pursue different political strategies now that they lack a trade association, these reports had not been validated. Therefore, the first objective of this research was to analyze changes in tobacco industry political strategies before and after the 1998 MSA in four issue areas. I collected data using tobacco industry documents regarding industry strategies on youth smoking restrictions and clean indoor air laws, and published two papers detailing changes in tobacco industry youth smoking prevention programs after the MSA. Two additional papers on these programs are currently under review for publication. The second part of this project compared the extent to which tobacco firms continue to coordinate their political activities after the 1998 Master Settlement Agreement by reviewing tobacco industry documents, analyzing industry campaign contributions, and interviewing policymakers and tobacco

control advocates. I have collected data on state and federal tobacco industry campaign contributions from 1990 to 2004, published a paper addressing regulatory strategies, and have two additional papers under review on the U.S. judicial system. I also analyzed industry campaign contribution patterns over time and presented two papers on this topic. The final part of this project surveyed perceptions of tobacco industry political influence in the wake of the settlement. Interviews with policymakers and advocates on this topic were completed in 2010 and integrated into papers submitted for publication.

This research sought to determine whether the restrictions imposed by the 1998 MSA, including the dissolution of industry trade associations, reduced the tobacco industry's ability to present biased research and limit its political power. The findings suggest that the tobacco industry continues to prevent the passage of effective tobacco control policies, building new alliances with government and public health groups unaware of industry intentions.

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Big Tobacco's Influence on the Food You Eat and the Air You Breathe: Industry Attempts to Shape the Convention on Biological Diversity and the Framework Convention on Climate Change

Background: The tobacco industry has a history of influencing law and treaty-making processes in order to create a favorable regulatory environment. This study examines tobacco industry interference in the negotiations and implementation of two international treaties - the Convention on Biological Diversity (CBD and Framework Convention on Climate Change (FCCC). Methods: We searched publicly available tobacco industry documents available at www.legacy.library.ucsf.edu using standard methods beginning with the key words Convention on Biological Diversity, Biosafety Protocol, Framework Convention on Climate Change, Montreal Protocol and Kyoto Protocol. We triangulated these findings with other publically available documents, including treaty contents and white papers. Results: The CBD and FCCC potentially impact tobacco production and manufacturing. Initially the Biosafety Protocol of the CBD, which began negotiations in 1996, sought to regulate the shipment of products containing genetically modified organisms (GMO) between countries. Tobacco companies were experimenting with genetically modified tobacco at this time. As part of a multi-industry coalition, Phillip Morris conducted extensive lobbying to prevent the Biosafety Protocol from monitoring all GMO containing products and to limit regulation to living modified organisms (LMOs). Limiting the protocol to LMOs would exclude harvested tobacco leaf from regulation. The industry was successful; the Biosafety Protocol only regulates LMOs. The Montreal Protocol of the FCCC phased out chlorofluorocarbons (CFCs), which were used in the cigarette manufacturing process. The Kyoto Protocol bans other greenhouse gasses like those produced by the tobacco-growing process (including deforestation for agricultural land and flue-curing tobacco). RJR penetrated the treaty-negotiation process through the placement of an RJR-Nabisco employee on the United Nations Environmental Programme Technical Options Committees which evaluated scientific evidence for treaty negotiators and recommended essential use exemptions. Serving on this committee represented a conflict of interest since RJR used CFCs. Phillip Morris worried about implementation of the Kyoto protocol by the US Environmental Protection Agency and worked with groups like the US

Chamber of Commerce to prevent the US implementation of Kyoto Protocol standards until the US ratified the protocol. Conclusion: Tobacco companies are active participants in the international regulatory arena beyond issues that are obviously health-related. By inserting themselves into the negotiations and implementation of non-tobacco-related international treaties, tobacco companies are influencing public policy in a way that favors industry over health and human welfare. It is crucial for public health officials and advocates to understand which non-tobacco related international treaties overlap with tobacco control concerns in order protect these treaties from tobacco industry influence. Funding: This work was supported by the California Tobacco Related Disease Research Program [award number 20FT-0077] and by National Cancer Institute at the National Institute of Health [grants number CA-113710, CA-87472].

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Tobacco Alkaloids and Tobacco-Specific Nitrosamines in Settled House Dust From Homes of Smokers and Non-Smokers Markers for Potential Exposure to Tobacco-Derived Toxic Substances

Objective: The goal of this study is to explore the utility of using settled house dust for assessing exposure to carcinogens and other toxic substances derived from tobacco smoke, including those formed as secondhand smoke ages to become thirdhand smoke. Methods: House dust was obtained from the household vacuum cleaners used in homes of smokers and non-smokers. Samples were extracted and analyzed by combined liquid chromatography tandem mass spectrometry (LC-MS/MS) for nicotine, other tobacco-alkaloids, and carcinogenic tobacco-specific nitrosamines. Results: As expected, nicotine was detected in dust from all homes, as it is a ubiquitous environmental contaminant, a major component of tobacco smoke. Two carcinogenic tobacco-specific nitrosamines (TSNA), N-nitrosonornicotine (NNN) and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK) were detected in most samples from non-smokershomes and in all samples from smokers homes. Conclusions: Analysis of settled house dust is an established method for assessment of exposure to toxic substances present indoors. Our data demonstrate that the two carcinogenic TSNA of greatest concern, NNN and NNK, are readily measured in house dust, supporting the use of house dust as a sample matrix for assessing potential exposure to tobacco-derived carcinogens.

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From Darkness to Daylight: Uncovering Tobacco Industry Secrets Using the Legacy Tobacco Documents Library Multimedia Collection New Acquisitions (2008-2011)

Tobacco control researchers' access to data about the tobacco industry was increased with the acquisition of audio and video tapes for the Legacy Tobacco Documents Library (LTDL). 2050 video and 200 audio tapes were acquired in digital and analog formats during the grant period (2008 - 2011). 1132

(975 videos and 157 audio recordings) were uploaded to the Internet Archive to give researchers immediate viewing/listening access. From 2008 to 2011 videos were downloaded and streamed 454,829 times, audio recordings 19,255 times. The LTDL Multimedia channel was set up on YouTube in 2009 and contains five video compilations that were viewed 82,305 times. Additional metadata, including names of people and organizations, was added to 1500 titles to facilitate discovery. Of particular interest to researchers interested in tobacco control efforts in California and the industry's response are approximately 150 video and audio tapes including focus groups on political issues, California Department of Health Services anti-smoking commercials, compilations of television news coverage segments about California-related issues, commercials supporting and opposing the passage of tobacco control referenda, and televised interviews and debates. Researchers investigating the tobacco industry's public image, involvement in the political process, sponsored youth smoking prevention programs, corporate responsibility programs, international expansion, and smokeless tobacco have significant new resources available: audiovisual materials in the Legacy Tobacco Documents Library. Of particular note are materials related to the industry's responses to tobacco control efforts in California.

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Density and Proximity of Tobacco Outlets to Youth Schools and Neighborhoods, Local Cigarette Prices and Compliance Rates with Underage Tobacco Sales Laws: Effects on Tobacco Use among Youth in 50 California Communities

The objective of this study is to examine the relationships among tobacco outlet density, proximity of tobacco outlets to schools and neighborhoods, local cigarette prices, cigarette sales compliance rates with underage tobacco sales laws, and youth cigarette smoking behaviors. The sample comprised 1,312 youth from 50 non-contiguous mid-sized California cities who were surveyed through a computer-assisted telephone interview about their smoking behaviors. To link their data with neighborhood and community characteristics, a spatially masked address of their block groups was created. Youth also provided information about their school locations, and observations in the 50 cities were conducted to document addresses of retail tobacco outlets. Confederate buyers, who were over age 18 but judged to be younger by an independent panel, visited 1,000 tobacco outlets in the 50 cities to collect information on local cigarette prices and compliance with underage sales laws. City-level characteristics, including population density, SES, and ethnic composition, were obtained from 2010 US Census data. Data collection activities have been completed. Future plans for this study include geocoding all location data and calculating proximity measures of tobacco outlets to youth schools and residence block groups. Multilevel regression analysis will then be used to address the research objective. Data analysis will be completed before the conference and results will be available for a poster presentation. Results of this study will help to inform policymakers regarding how best to craft local policies to reduce youth access to tobacco through land use or zoning laws, cigarette taxation and prices, and licensing. Funding: Tobacco-Related Disease Research Program [19CA-016, Sharon Lipperman-Kreda PI] and National Cancer Institute [CA138956, Joel Grube PI].

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Joel W. Grube, Karen B. Friend, Prevention Research Center, Pacific Institute for Research and Evaluation

Local Retailer Compliance Rates with Underage Tobacco Sales Laws and Cigarette Prices in 50 California Communities: Relationships with Community-level Characteristics

The purposes of this study are, first, to determine local rates of retailer compliance with underage tobacco sales laws and local cigarette prices in 50 non-contiguous mid-sized California cities. Second, we examined the relationships among retailer compliance, cigarette prices and community characteristics, including population size, percentage of minors, median household income, education, ethnic composition, community disorganization, community smoking norms, and an overall index of local tobacco policy effectiveness. Rates of compliance with underage tobacco sales laws and local cigarette prices (Marlboro or Newport) were obtained from access surveys conducted by confederate buyers, who were over age 18 but judged to be younger by an independent panel, in 1,000 tobacco outlets in the 50 cities. Indicators of community norms and community disorganization were obtained from 8,918 adults in these communities and were aggregated to the city level. Measures of city characteristics were obtained from 2010 Environmental Systems Research Institute data. Municipal tobacco codes of the 50 California communities were reviewed and scored for their effectiveness in discouraging youth smoking. Results showed that rates of retailer noncompliance with underage tobacco sales laws ranged from 0% to 65% (M=14.50, SD=12.83). Local cigarette pack prices demonstrated a 21% to 100% difference within the 50 cities (M=49, SD=18). Linear regression analyses indicated that high levels of noncompliance with underage tobacco sales laws were positively associated with population size and high level of community disorganization. Lower average cigarette prices were positively associated with smaller populations, lower median household income, lower levels of community disorganization, and higher prevalence of adult smokers in the community. These findings suggest that youth access to tobacco, either through retailer noncompliance or lower prices, is greater in communities with higher levels of social disorganization and lower incomes. Funding: Tobacco-Related Disease Research Program [19CA-016, Sharon Lipperman-Kreda PI] and National Cancer Institute [CA138956, Joel Grube PI].

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Exploring Retailer Abandonment of Tobacco Sales

Background: Tobacco outlet density is linked to a greater likelihood of youth and adult smoking. In the past decade, over 900 pharmacies and 4 grocery store chains in California have voluntarily stopped selling tobacco products. No previous studies have examined the reasons for this emerging phenomenon. Objective. We sought to learn what motivated retailers to discontinue tobacco sales and what employees and customers thought about their decision. Methods: We conducted qualitative case

studies of seven retailers, utilizing owner and employee interviews, consumer focus groups, and unobtrusive observations. Results: For independent pharmacies, the only reason given for the decision to end tobacco sales was that tobacco caused disease and death. Grocers listed health among several factors, including regulatory pressures and wanting to be seen as making a difference. Few stores advertised their discontinuation of tobacco sales and media coverage was limited. As a result, store customers in focus groups were usually unaware of the change. Nonetheless, they were largely supportive, viewing it as promoting public health. Conclusion: Retailers' decision to voluntarily end tobacco sales disrupts the normalization of smoking created by ubiquitous availability of cigarettes, but will be most effective only if the public is aware of it. In the absence of retailer publicity, tobacco control advocates should consider ways to reward such businesses for their responsibility and create ongoing support for these efforts.

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The Effectiveness of the California Tobacco Control Program: Major Reductions in Smoking Behaviours and Lung Cancer Rates over the Past 40 Years

Background: Declining lung cancer rates in California have been attributed to the California Tobacco Control Program, but may reflect earlier declines in smoking. Methods: Using state-taxed sales and 3 survey series, we assessed trends in smoking behavior for California and the rest of the nation from 1960-2008 and compared these with lung cancer mortality rates. Results: From 1960 to 2002, the state-taxed sales and survey data are consistent. Californians initially smoked more than the rest of the nation, but cigarette consumption declined earlier, dropping lower in 1971 with an ever-widening gap over time. Lung cancer mortality follows a similar pattern, after a lag of 16 years. Introduction of the California Tobacco Control Program doubled the rate of decline in cigarette consumption. In 2010, smoking prevalence is estimated to be 9.3% in California and 17.8% in the rest of the nation. However, in 2008, for the first time, both cigarette price and tobacco control expenditures were lower in California than the rest of the nation, suggesting that the gap in smoking behavior will start to narrow. Using a birth cohort analysis, we demonstrate that the California effect was achieved by changes in all three of the smoking behaviors: smoking initiation, smoking cessation and consumption level among continuing smokers. Conclusion: The California Tobacco Control Program was effective in changing all levels of smoking behavior so that both prevalence and consumption are now half the level of the rest of the country. Given the correlation between these difference in smoking behavior and lung cancer rates over the past 20 years, we predict that California will have much faster declines in lung cancer than the rest of the nation for the next 16 years, but possibly not beyond.

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Home-Smoking Bans Among U.S. Households with Children and Smokers: Opportunities for Intervention

Background: Public health campaigns have reduced the exposure of U.S. children to secondhand smoke at home; however, these may not have been equally effective across subgroups. Objective: To examine prevalence of home smoking bans among U.S. households with both children and smokers, over time and by demographic subgroups. Methods: The Tobacco Use Supplement to the Current Population Survey (TUS-CPS) is a nationally representative household survey of tobacco use. The 1992/1993 and 2006/2007 TUS-CPS interviewed 22,746 households from a major race/ethnic group with both children and adult smokers. Statistically significant predictors of complete home-smoking bans among demographic subgroups were identified using multivariate logistic regression. Results: Complete home smoking bans among U.S. households with children and smokers (smoking families) more than tripled, from 14.1% in 1992/1993 to 50.0% in 2006/2007. However, non-Hispanic white and African American smoking families lagged behind Asian/Pacific Islanders and Hispanics. In 2006/2007, 67.2% of African American smoking families allowed smoking in the home, as did 59.2% of smoking families with all children ages 14 and above. Bans were more likely among more educated households and in states with lower adult smoking prevalence; however, these differences were attenuated in some racial/ethnic groups. Conclusions: As of 2006/2007, only half of U.S. households with both children and smokers had complete home smoking bans. Home bans were less common among smoking families with older children, in African-American households, and in Hispanic or non-Hispanic white households in states with high smoking prevalence. Interventions are needed to promote smoke-free homes among these groups.

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The Current Status of Smoke-free Spaces in Northern California Casinos: Patterns and Prospects for Policy Development

Objective: As baseline data for a study of changes in smoke-free policies in tribally-owned casinos, which are not subject to state smoke-free workplace laws, the authors assessed smoke-free policies in tribally-owned casinos in Northern California including how much and which spaces were deemed smoke-free under these policies. Methods: Management in all 37 tribally owned casinos in Northern California (with Monterey, Kings, Tulare and Inyo Counties forming the lower boundary) were contacted by phone or in person and asked to describe which areas, if any (including hotels, restaurants, bingo halls and slots floors) were currently covered by smoke-free policies. The policies were categorized by type of smoke-free space, tallied and mapped, using Guttman Scaling to analyze patterning in escalating levels of smoke-free space protection. Summary of data: To date, only one casino in the study area features a comprehensive smoke-free policy. The most common smoke-free spaces within the casinos were restaurants. Other casinos also had dedicated smoke-free slot areas, although protection is limited when there is no barrier between these areas and those where smoking is permitted. Nine casinos had no smoke-free policies whatsoever. Conclusions: There is substantial variation between establishments

in the degree to which casinos have demarcated smoke-free spaces. Smoke-free policies most often begin with smoke-free restaurants. This pattern may mirror a generalized norm shift to smoke-free dining in California. Our finding of a scale or continuum of policy coverage suggests that creating additional smoke-free spaces within tribally-owned casinos is not only entirely feasible but has already begun.

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The Effect of Peer Crowd Identity Appeals on Adolescent Response to Anti-smoking Ads

Objective: This study links research on peer crowd identification (an adolescent's affiliation with an image-based group or subculture) to tobacco control campaigns by evaluating the extent to which the use of peer crowd targeted appeals in anti-smoking ads are effective in producing increased attention to the ad, increased perceptions of similarity to youth in the ads, increased liking of the ad and increased perceived effectiveness of the ad. Methodology: A sample of 501 adolescents aged 12-15 years participated in an online survey. Participants were randomly sampled from a nationally representative panel of adolescents. Participants were provided with a list of 11 peer crowds (elites, outsiders, emo, skaters, hip-hop, goody-goodies, academics, rockers, deviants, musicians and regulars; this list of peer crowds was obtained through a procedure in a separate survey) and asked to choose the crowd with which they most strongly identified. Participants were then randomly assigned to view an anti-smoking print ad that contained an image of youth who either did (peer crowd identity aligned) or did not (peer crowd identity discrepancy) match their peer crowd. The peer crowd manipulation contained in each ad was validated in a previous survey. Immediately after viewing the ad, participants were asked eight items measuring four dimensions of participant response to the ad. Attention was measured by asking the extent to which participants to indicate the extent to which they felt the ad was boring and felt it would grab their attention in a magazine. Perception of similarity to youth in the ad was measured by asking participants to indicate how similar they felt they were to the youth in the ad and how relevant they felt the ad was to them. Liking was measured by asking participants to indicate how boring they thought the ad was and the extent to which they did not like the ad. Perceived effectiveness of the ad was measured by asking participants to indicate whether the ad influenced them not to smoke and how likely they would be to tell their friends about the ad. These four dimensions were chosen to represent response to the ad due to empirical evidence indicating that they mediate the effect persuasive messages have on behavior. Findings: A separate general linear model was run for each dependent variable, with the ad type (peer crowd identity aligned vs. peer crowd identity discrepancy) entered as a fixed factor and age, ethnicity and lifetime number of cigarettes smoked entered as covariates. Results of the analysis indicated that adolescents who viewed an ad that aligned with their peer crowd identity had significantly higher levels of perceived similarity to youth in the ad and perceived the ad as being more effective. Attention to and liking of the ad did not vary significantly as a result of peer crowd identity alignment or discrepancy. Conclusions: These findings indicate that appeals targeting an adolescent's peer crowd identity are related to increased perceptions of similarity to those in the ad and increased perceived effectiveness of the ad - two important factors mediating the relationship between

exposure to a persuasive message and subsequent behavior change. Thus, these findings suggest that peer crowd identity-based appeals may be an effective technique that tobacco control campaigns can leverage.

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Waking a Sleeping Giant: Polonium in Tobacco

Historical perspectives can be useful in understanding why the cigarette remains as deadly as it is. In the 1960s, in response to mounting concerns over the health hazards of cigarettes, the tobacco industry responded privately by building extensive and most often secret internal research laboratories staffed by highly trained scientists devoted to studying carcinogens in cigarettes. This was in direct contrast to their public response of obscuring and confusing awareness of the hazards. One such laboratory was focused on studying radioactive polonium 210 in tobacco. The impressive extent to which tobacco manufacturers understood the hazards of polonium in cigarettes and their longstanding knowledge of how to reduce it will be discussed in this paper. Radioactive polonium was discovered in tobacco in 1964 and in the following decades there was much work linking it to lung cancer in smokers. Meanwhile, industry scientists pursued similar work with the goal of protecting business interests should the problem ever become public. Organizations working on tobacco control should consider polonium-210 an excellent poison of tobacco to ban under new and future legislation, especially given the fact that the industry already knows how to do so. The purpose of this paper is to use internal documents available through litigation to chronicle the untold story of a single hazardous element. The polonium story offers an opportunity to look into the relationship between science and the industry and to explore their sophisticated and well-funded investigations on this issue. By tracing the industry's response to a particular element-hazard one can construct a historical understanding of the ways in which the tobacco men think about and respond to individual health concerns. What's more, examining the industry's research on polonium 210 offers the opportunity to study the broader history of the industry's internal research laboratories, many of which were closed in the 1980s amid concerns of litigation. In this way, historians can help inform tobacco control efforts by understanding the inner workings of industry science and research and in so doing, offer new ways to anticipate industry behavior in response to new scientific advances.

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Application of Proxyl-fluorescamine for Measurement of Reactive Oxygen Species in Secondhand and Thirdhand Tobacco Smoke

Reactive oxygen species (ROS) and related free radicals play a key role in the chemical transformation and adverse health effects of toxic and allergenic air-particulate matter. This work presents a novel approach for rapid sampling and measurements of ROS using a profluorescent nitroxide, proxyl-fluorescamine (PF), coated on glass beads and followed by HPLC-fluorescence analysis. The method was successfully applied for detection of ROS in fresh and aging secondhand cigarette smoke as well as in

secondary organic aerosols (SOA) generated from nicotine-ozone reactions. Results were compared with dichlofluorescein (DCFH), used as reference probe. In addition, the effect of aging on aerosol size and composition was investigated using real-time aerosol mass spectrometry. Results showed high levels of free radical (R) concentrations (13-48 nmol mg-1 of equivalent H2O2) in fresh (0.5h) and aged (22h) tobacco smoke. These levels were consistent with those measured by DCFH and also reported previously using nitroxide probes, confirming that tobacco smoke is an important source of ROS indoors. PF responded selectively to free radicals (R) in SOA from nicotine-ozonolysis. The R detected by PF associated with SOA particles whereas ROS measured by DCFH primarily in the gas phase. Furthermore, while PF was stable and non-reactive to ozone, the response of the DCFH could lead to over-estimation of ROS in particles formed by ozonolysis. This case study presents a good basis for employing PF on solid supports to measure ROS generated from cigarette smoke as well as from other combustion and ambient aerosols.

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Adapting The MTT Cytotoxicity Assay For Use With Human Embryonic Stem Cells

The MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay, which measures cell viability and can be used for cytotoxicity studies, requires that a known cell number be plated in each well of a 96-well plate and is generally used with single cells that are easily counted. Human embryonic stem cells (hESC) are not readily adaptable for use in 96-well plate assays because they survive best when plated as small colonies, which are difficult to count and plate accurately. To address this problem, two protocols were developed to perform the MTT assay using hESC. In the first protocol, plating was done with Rho associated kinase inhibitor (ROCKi), which allowed accurate counting and plating of single hESC. The second protocol involved plating hESC using adaptations that allow accurate counting and plating of small colonies. In the ROCKi protocol, single cells were counted using a hemocytometer then plated at 20,000 cells/well. For the small colony protocol, we first developed a spectrophotometric method to rapidly and accurately determine cell concentration in suspensions of colonies by generating a standard curve based on colony turbidity. The percent transmittance readings were taken multiple times for the same sample and produced a coefficient of variation (COV) of 1.5%, indicating high accuracy. Next, we determined the optimal cell concentration (20,000 cells/well) needed to carry out an experiment lasting 72 hours. To confirm that the correct cell number was pipetted accurately into each well of a 96-well plate, control wells were subjected to the MTT assay and used to calculate the COV, which ranged from 0.7% to 8.5%, indicating that the pipetting of small colonies was uniform was uniform in each well. Finally, tests were done to show that drift and edge effects were not present in 96-well plates prepared using our plating method. When comparing the ROCKi and small colony protocol, ROCKi caused a leftward shift in dose response curves. For example, the dose response curve for phenol, a chemical in tobacco smoke, shifted position when ROCKi was used during cell plating, and produced an IC50 of 8.6 x 10-4 M, as compared to an IC50 of 1.34x10-3 M in the small colony protocol. In addition, ROCKi altered hESC morphology and appeared to stress cells, while cells in the small colony protocol

appeared healthy, tightly packed, and cobblestone-like. Others have found that ROCKi affects the toxicity of methylmercury (Fujimura et al. 2010, Toxicol. Appl. Pharmacol. 250:1-9). Both protocols allowed the MTT assay to be carried out rapidly and accurately with high reproducibility between replicate experiments using hESC. However, the protocol that uses ROCKi to plate hESC may not be appropriate for toxicological work due to the shift in dose response curve. The small colony method could be adapted to any 96-well plate assay and provides a new method for using hESC in toxicological studies.

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Performance Evaluation of Electronic Cigarettes

Introduction: Electronic cigarettes (e-cigarettes) are tobacco-free devices that deliver nicotine by heating cartridge fluid containing nicotine, flavorings, and a humectant. In this study, the performance of eight brands of conventional cigarettes and 12 brands of e-cigarettes was compared using a smoking machine. Methods: The airflow rate required to generate aerosol/smoke, pressure drop (which measured ?leakiness? or pressure decrease across a cigarettes during a puff), and aerosol/smoke density were examined using three protocols. Results: First 10-puff protocol: During the first 10 puffs, pressure drop for the eight brands of conventional cigarettes ranged from 30 to 80 mm H2O. For the eleven e-cigarettes evaluated, pressure drop ranged from 14 to 153 mm H2O. Four brands of e-cigarettes had higher pressure drops than conventional brands, four brands fell within the conventional range, and four brands were on the lower border of this range. The airflow required to smoke conventional cigarettes was the same across brands (7 ml/sec), but highly variable among e-cigarettes (range = 4 to 21 ml/sec). For conventional and e-cigarettes, smoke density was relatively stable over the first 10-puffs. Density ranged from 0.1 to 1.2 absorbance units across conventional brands and from 0.1 to 0.5 absorbance units across e-cigarette brands. Smoke-out protocol: E-cigarettes within a brand generally performed similarly when puffed to exhaustion; however, there was considerable variation among brands in pressure drop, airflow rate required to produce aerosol, and the total number of puffs produced. Aerosol density oscillated between puffs and eventually decreased to the point that higher airflow rates were required to continue aerosol production. Replacing the battery during the smoke-out experiments did not significantly increase aerosol production, indicating decreases in aerosol were due to decreasing amounts of cartridge fluid. The total number of puffs varied among brands of e-cigarettes from 160 to 400 per cartridge. During smoke-out of the e-cigarettes, the average air flow rate, in general, remained the same, while the average pressure drop in all cases increased. Air hole areas in e-cigarettes were correlated with pressure drop for some brands. Eleven-puff repetitive trials: Two copies of the same e-cigarette model were tested in 11-puff repetitive trials. The two e-cigarettes performed quite differently with respect to pressure drop and airflow required to produce aerosol. Atomizers and batteries were not completely interchangeable between the two copies. One copy stopped producing aerosol during the third repetitive trial. Conclusions: In contrast to conventional cigarettes, there was significant variability among e-cigarette brands in the airflow rate required to produce aerosol and pressure drop during puffing. Moreover, the length of time cartridges lasted and the density of the

aerosol produced varied among e-cigarette brands. Variation in performance properties within brands suggests a need for better quality control during e-cigarette manufacture and raises questions regarding their effectiveness for nicotine delivery. These data may be useful when developing smoking machine protocols for e-cigarettes and for regulators making policy regarding their use and manufacture.

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Evaluating a City's Smokefree Policy in Multi-Unit Housing

Objective: The overall objectives of this exploratory, descriptive project are 1) to study what the key stakeholders know about Richmond's smoke-free MUH ordinance, 2) to discern their levels of knowledge and understanding of the ordinance, 3) to identify any potential barriers, 4) to implement an intervention based on levels of knowledge (or lack thereof) to bolster the adherence of the ordinance, and 5) to evaluate the implications for the successful implementation of smokefree ordinance. Methods: We are conducting an evaluation case study of the adoption and implementation of a recently enacted citywide ordinance to reduce secondhand smoke (SHS) exposure in multi-unit housing (MUH) residences in Richmond, California, United States. The evaluation emphasis is of a formative and process nature, in that the study is investigating the adoption and actual implementation of a citywide policy. We are conducting focus groups and one-on-one interviews with community stakeholders such as residents, landlords, city officials, law enforcement, and local public health advocates. Results: To date, we have identified nine city officials, regulatory agents and community advocates to be interviewed as part of our discovery process. We have gained entrée into the community through previously established relationships with local leaders and have formed a community advisory board (CAB) to assist in building partnerships with community residents who want to participate in a deeper capacity on the project. CAB will also guide the research team on recruitment strategies for the focus groups and additional interviews. Our CAB is pivotal in providing input about the community intervention that will be based on qualitative data from the focus groups and interviews. Conclusions: Given that smokefree policies in MUH is a new area of interest in tobacco control, it is important to understand how community residents and other stakeholders adopt and carry out these policies. This study offers an opportunity to conduct an in-depth case study of how best to implement such a policy. The overall goal of this project is to ensure that this new and innovative policy is adopted and implemented citywide, equitably across the socially and economically diverse communities within the city. Additionally, results generated from this study could inform other cities and municipalities how they can smoothly adopt and implement similar policies.

Joy Zakarian, San Diego State University Research Foundation

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Thirdhand Tobacco Smoke in California Rental Cars and Hotel Rooms: Limitations of Voluntary Smoking Restrictions

Introduction. The effectiveness of policies for maintaining smoke-free indoor environments in the hospitality industry was examined in hotel rooms and rental cars. Methods. A stratified random sample of 250 rental cars was selected from national and local car rental company branches in San Diego County. Upon reserving the cars, we requested a non-smoker or smoker car, or did not specify a smoking preference (i.e., unknown smoking designation). Smoker or nonsmoker designation was confirmed when cars were picked up. Dust, surfaces, and the air of each vehicle cabin were sampled, and each car was inspected for signs of tobacco use. Seventy hotel guestrooms from 40 San Diego County hotels were sampled. Surface wipe samples from a nightstand and the outside of the door and an air sample were collected from each room. Baseline and post-hotel stay urine and finger wipe samples were obtained from nonsmoking confederates. Interviews and hair and urine sampling were conducted with hotel housekeepers. Results. Older and higher mileage cars had significantly higher levels of nicotine pollution in dust and on surfaces, independent of smoking status. Controlling for mileage, cars from local and national companies did not differ in THS levels, and nonsmoker cars had significantly lower levels of nicotine on surfaces and in dust and lower levels of nicotine and 3EP in the air than smoker cars. Based on nicotine thresholds developed for private used cars of nonsmokers with car smoking bans, 52-75% of putative nonsmokers cars rented from local companies and 44-54% of those rented from national companies had nicotine levels in dust, air, or surfaces above nonsmoker thresholds. Based on the overall visual and olfactory evidence (i.e., signs of ash, burn marks, or odor), a majority of cars from local (68% to 90%) and national (59% to 67%) companies appeared to have been smoked in, regardless of their putative designation as nonsmoker or smoker cars. Non-smoking signage in cars was associated with lower levels of THS pollutants in dust and air. Surface wipe nicotine levels and air levels of nicotine and 3-EP were higher in smoking-permitted hotel rooms compared to nonsmoking rooms in smoking hotels and nonsmoking rooms in nonsmoking hotels. Nonsmoking rooms in smoking-permitted hotels were more polluted than those in nonsmoking hotels. Not surprisingly, smoking rooms in smoking permitted hotels were significantly more polluted than nonsmoking rooms in the same hotels and nonsmoking rooms in nonsmoking hotels. Based on cut-offs previously discriminating between smoker and non-smoker homes, 47% of nonsmoking rooms in hotels that offered smoking rooms had surface nicotine levels above thresholds, and 25% had air nicotine levels above the cut-off. Confederates finger wipes were significantly more likely to be contaminated with nicotine when the confederate stayed in a room where smoking had been permitted as compared to nonsmoking rooms. Confederates also had a significant increase in urine cotinine following their stay. The change in urinary NNAL was assessed before and after sleeping in the 10 most contaminated rooms (all smoking-permitted), as measured by surface wipe nicotine levels. Urinary NNAL levels significantly increased after sleeping in these rooms, with an average increase of 0.39 pg NNAL/mg creatinine. Levels of cotinine in housekeeper urine samples were significantly positively correlated with the reported number of rooms cleaned per week that had recently been smoked in (rho = 0.554, p = 0.021).

Conclusions. Current California Code allows hotels to designate up to 65% of rooms as smoking rooms. These policies fail to protect nonsmoking rooms from being contaminated with tobacco pollutants. These policies also fail to protect nonsmoking guests staying in these rooms from exposure to tobacco smoke pollutants. Nonsmoking housekeepers who clean smoking rooms are also exposed to tobacco smoke pollutants. Local and national car rental companies have adopted various voluntary tobacco policies to provide their customers with smoke-free cars. Regardless of companies' smoke-free policies and ostensible nonsmoking designation of cars, a majority of rental cars appear to be smoked in and accumulate more pollutants over time. To better protect nonsmokers from exposure to tobacco smoke in hotels and rental cars, complete indoor smoking bans, better communication of policies to employees and customers, and reliable and valid compliance monitoring may be needed.

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Videobioinformatics Tracking of Calcification in Osteogenic Cultures derived from Human Pluripotent Stem Cells for Use in Teratogenicity Screening of Tobacco Products

We have previously used osteogenically differentiating murine embryonic stem cells (ESCs) to predict the teratogenicity of pharmaceutical compounds on the developing skeleton. Here, we focus on utilizing these cells to predict bone teratogenicity of tobacco products while simultaneously transferring our assay to primate species, which will be more predictive for human use. Specifically, we are developing video bioinformatics tools, a new method of analysis to obtain data from images or videos, for the understanding of toxic dynamic cellular processes in human ESCs (hESCs). This seems possible as the osteoblast-associated calcified matrix is positive for osteocalcin, a unique protein secreted into the bone matrix, and has a black coloration in static photomicrographs, which can be quantified employing morphometric image analysis. We have captured time-lapse videos of hESCs as they differentiated using the Nikon Biostation CT, an integrated cell culture observation system. Images were captured every 8h for a period of 15 days and analyzed to measure the degree of calcification during the differentiation process. The amount of calcification was estimated using a statistical image segmentation technique and compared to biochemical assays, which allowed us to establish a 3D mineralization pattern (x, y, t). Although these results are promising, the use of hESCs faces a variety of ethical controversies, revolving around their embryonic origin, that deter the continuation of their investigation. In contrast, human induced pluripotent stem cells (hiPSCs) offer a less controversial path, since they are artificially generated from adult somatic cells. Using videobioinformatic tracking of calcification, we also aimed to study the similarities found between hiPSC-derived osteoblasts and those differentiated from hESCs. This novel approach avoids the manual measurement of calcification and provides insight into the regions where differentiation occurs over time. In conclusion, video bioinformatics is a rapid and economical analysis method for determining temporal cellular changes in differentiating pluripotent

stem cells and may be used in the future to establish kinetics of tobacco toxicity.

DISPARITIES & CESSATION

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Chinese Community Internet Stop Smoking Project: A Community-Academic Partnership

Objective: The Chinese Community Internet Stop Smoking Project aims to establish a community-academic partnership to build accessible and sustainable online self-help resources to promote smoking cessation among Chinese smokers in the U.S. and globally. The presentation will describe the process involved developing an internet stop smoking program that aims to deliver evidence-based smoking cessation resources to Chinese smokers, their families and health providers. Background: Chinese consume one third of all cigarettes globally. Chinese American males who have low English proficiency or recently immigrated have disproportionately higher smoking prevalence than the general US population. Chinese is the second most commonly used language on the Internet next to English. Internet holds great outreach potential to effectively deliver smoking cessation resources to Chinese communities globally. Methods: The Project has established a Smoking Cessation Task Force currently consisting of four San Francisco community-based organizations and academics. The Task Force activities target to: i) establish interconnectedness among membership organizations by enhancing leveraged on-line resources shared among the agencies; ii) explore barriers and facilitators in reaching client populations that served by the membership organizations via the Internet; iii) formulate outreach strategies to recruit Chinese smokers; and iv) develop culturally and linguistically appropriate internet-based smoking cessation program for Chinese smokers locally and globally. An open feasibility trial will be conducted to examine recruitment, users' satisfaction, and short-term smoking cessation outcomes at 1, 3, and 6 months. Summary of Current Progress: The Task Force has selected the UCSF Internet World Health Research Center Stop Smoking program (www.stopsmoking.ucsf.edu), which has yielded 20% quit rates at one-year consistently in 4 trials, as the prototype for building an evidence-based online smoking cessation program for Chinese smokers. The development has incorporated input from the Task Force and community reviewers on cultural appropriateness, content, and features to adapt for the website prototype through focus groups and worksheets. The website will be launched in Spring 2012. Preliminary user data will be presented. Conclusions: This project will fill a current gap in the literature about effective smoking cessation strategies targeting Chinese Americans. Feasibility trial results will be used to refine the intervention and design a large-scale trial to examine the effectiveness of the online program.

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Recruitment of Chinese American Smokers for an Internet Stop Smoking Program

The objective of this study is to examine outreach strategies for recruiting Chinese American smokers into utilizing an Internet Stop Smoking Program developed by the Chinese Community Internet Stop Smoking Project. The primary mission of the Chinese Community Internet Stop Smoking Project (Parent Project) is to establish accessible, evidence-based, and sustainable self-help resources via the Internet to promote smoking cessation among Chinese Americans. Background: The need for developing effective smoking cessation programs that serve the Chinese American population, especially among the new male immigrants, is fast growing. Internet-based self-help interventions hold high potentials in reaching a large population of Chinese Americans. Since 2008, China has surpassed the U.S. as the top nation in the world in the number of Internet users. Chinese is the second most commonly used language on the Internet next to English. [Asian Americans have the highest rates of Internet access (82%) among all racial groups in the U.S. (75% Whites, 59% blacks, 55% Hispanics). Among the foreign born Asian respondents aged 18 or above, 89% males and 84% females reported access. High Internet access across age groups among the foreign born Asian respondents were reported: > 90% for those aged under 45, > 75% among those between ages 45 and 64, and 69% for those aged > 65. The Internet has been shown to be an effective method of improving health outcomes and delivering user-tailored health messages. Limited studies have addressed the effectiveness of outreach strategies for recruiting Chinese smokers to utilize smoking cessation resources, especially those on the Internet. References available upon request. Methods: To achieve the aforementioned objective, the study will: (1) Establish a Task Force with representatives from community partners and academia. (2) Utilize various outreach recruitment strategies and evaluate their effectiveness. Strategies include promotion of the project through established community network to recruit participants, media (i.e. newspapers, talkshows, commercials, television and radio announcements, Internet), listserves, promotional flyers, and word-of-mouth. Monetary incentives for participants will also be provided. Data Summary: Participants have been successfully recruited into the study thus far. Four community reviewers were recruited via already-established community networks. Community Task Force members utilized bilingual (Chinese and English) promotional flyers and word-of-mouth promotion to recruit 10 eligible reviewers. The eligible reviewers attended an in-person screening session and completed eligibility questionnaires as well as participated in a verbal exchange with the Parent Study's investigative team and other reviewers. Recruitment for usability testing participants is ongoing. Local and global outreach strategies are being explored. On a local scale, community-based venues and media will continue to be used and explored to recruit Chinese American smokers. Possible outreach strategies to be explored include producing and disseminating promotional items such as informational cards displaying the smoking cessation website, sponsoring booths at local events, promoting the site through instructional computer classes, empowering family members and friends, including youth, to teach Internet-related skills to their

smoking counterparts, which will increase access for parents to utilize the stop smoking website and other Internet-based resources. Focus groups and/or individual interviews exploring barriers and promoters in utilizing Internet-based resources may also be conducted to shape recruitment efforts. For global outreach, online advertisements, community partners websites, and social media networks will be used to recruit potential smokers in the United States and internationally. Conclusions: Outreach methods such as utilizing community-based networks, promotional flyers, and word-of-mouth have been shown to be successful recruitment strategies. Effective recruitment strategies will continue to be explored during the usability and feasibility trial phases of the Parent Study.

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A Culturally Competent Internet Stop Smoking Program for Chinese Smokers: The Chinese Community Internet Stop Smoking Project Experience

The objective of this study is to identify cultural factors that need to be addressed in developing an internet-based stop smoking intervention targeting Chinese immigrant smokers. The primary mission of the Chinese Community Internet Stop Smoking Project (Parent Project) is to establish accessible, evidence-based, and sustainable self-help resources via the Internet to promote smoking cessation among Chinese Americans. Background: The need for developing effective smoking cessation programs that serve the Chinese American population, especially among the new male immigrants, is fast growing. According to the 2002-2003 National Latino and Asian American Study, the smoking prevalence for Chinese American men and women was 23.6% and 2.4% respectively . [The 2007 California Health Interview (CHIS) found the smoking prevalence rates among Chinese Americans in California were 16% and 2.9% for men and women, respectively. In 2007, according to CHIS estimates, every one in 4 Asian smokers is a Chinese American (24%).] The 2004 California Chinese American Tobacco Use Survey (CCATUS), showed similar smoking prevalence rates at 14% and 2% among males and females, respectively. However, significantly high smoking prevalence was observed among Cantonese-speaking Chinese men (21.7%). Self-determination or will power was most frequently described as a helpful method in quitting smoking among both Chinese and Vietnamese smokers. Most Chinese are not familiar with counseling approaches, and are unfamiliar with seeking professional services Added to the lack of familiarity is the cultural factor of ?loss of face? and shame in any external help-seeking behavior thereby preventing Chinese smokers from utilizing cessation assistance or participating in traditional counseling-based smoking cessation programs. These cultural characteristics reflect the need to develop conveniently accessible self-help resources that promote utilization in a culturally acceptable manner. References are available upon request. Methods: To achieve the aforementioned objective, the project will undertake the following steps: (1) Establish a Task Force with representatives from community partners and academia. (2) Prototype Evaluation: Community members representative of the target population will review the current English-version of the UCSF-IWHRC Internet Stop Smoking website

and provide suggestions for developing the intervention's website. (3) Usability Testing: The bilingual (Chinese and English) website prototype will undergo one-on-one usability testing sessions to identify areas to refine the website to enhance user's positive experience and engagement and pre-test the intervention content. (4) Conduct a pilot feasibility trial to assess demographics and acculturation, Internet Use Experience, Health Conditions, Depression, Usability/User Statistics, Satisfaction, and smoking stats/cessation Outcome Variables. Data Summary: Two former and two current Chinese American smokers (3 males, 1 male) were selected as community reviewers . These reviewers were selected among 10 potential candidates based upon the reviewer inclusion criteria: at least 18 years of age, former or current smoker, Chinese immigrant, bilingual, and bicultural. The review process was conducted through 2 in-person focus groups and review worksheets. Overall, the reviewers supported that the Internet can be a platform for Chinese smokers to quit smoking if the platform contains tools that are culturally appropriate and include features that are user-friendly, engaging, resourceful, useful, practical, and customizable. For the cultural appropriateness component, reviewers suggested content and theme changes for the site to be more appealing to Chinese American smokers. Particularly, reviewers suggested to avoid using the term anxiety because of its associated stigma in the Chinese culture. Furthermore, reviewers suggested tailoring the concept of helpful and harmful thoughts to the Chinese community by highlighting the practicalities of quitting smoking, such as saving in health-related costs due to better overall health. All feedback, including suggestions to cultural appropriateness, has been incorporated into the intervention website. Conclusions: Preliminary findings from the community reviewer process indicate cultural appropriateness as key feature in developing smoking cessation resources in the Chinese community. Cultural factors needing to be addressed in an Internet-based smoking cessation intervention will continue to be identified throughout the usability and feasibility testing phases of the Parent Study.

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Waterpipe Smoking among Arab American Women

Introduction: A popular form of tobacco use among Arab Americans is waterpipe smoking. However, there is a paucity of research conducted on waterpipe smoking among Arab American women. Waterpipe smoking is a centuries-old tobacco use method in which inhaled smoke, generated from charcoal-heated tobacco placed on the waterpipe head, passes through a partially-filled water base connected to a mouthpiece by a hose. The tobacco used in waterpipe smoking is a mixture of crude types of tobacco fermented with molasses and additives, such glycerin and fruits. Charcoal heats the tobacco which produces sweet and perfumed smoke that the smoker inhales. One objective of this study named Al-Wikaya was to identify predictors of regular waterpipe smokers versus occasional waterpipe smokers among Arab American women. b) Methods: The Al-Wikaya Study was a cross-sectional survey of a convenience sample of male and female Arab American adult waterpipe smokers, living in San Diego, California. Based on the Behavioral Ecological Model, the Principle investigator, Dr. Nada Kassem, designed in English and Arabic the Al-Wikaya waterpipe questionnaire using national surveys and data from waterpipe smokers focus groups. The questionnaire was pretested and pilot

tested before administration. Between 2006 and 2008, a total of 176 Arab American female waterpipe smokers, recruited and screened for eligibility, completed the self-administered questionnaire. c) Results: The female participants were between the ages of 18 to 80 years, with a mean age of 29 years (SD=13). A total of 104 women (59.1%) reported smoking waterpipe regularly, and 72 women (40.9%) reported smoking waterpipe occasionally. About two thirds (63.6%) of the women in the sample had an educational level less than a college degree. Similarly, 62.4% reported that they do not have a spouse. Seventy two percent reported that they were employed, and about seventy percent (70.5%) had an annual household income of thirty thousand dollars or above. Approximately, half of the participants (55.6%) were born in the Middle East, with the remaining were born in the western region. The percentage of women who started smoking waterpipe at or before the age of 18 years was 47.6%. Forty two percent of the total sample smoked waterpipe inside their home, while about fifty six percent (55.8%) smoked waterpipe with one close friend. d) Conclusions: After controlling for demographic characteristics, findings from logistic regression analyses indicated that regular waterpipe smoking was positively associated with smoking a waterpipe at home (P=.010), smoking a waterpipe with one close friend (P=.003), and initiating waterpipe smoking at an early age (P=.023). These predictors will help identify points of intervention to help design tailored health prevention programs to curb waterpipe smoking among Arab American women.

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Factors Associated with the Use of Research-Validated Tobacco Prevention and Cessation Programs in California Schools

In contrast to previous years of decline, currently the prevalence of tobacco use among adolescents in California is increasing (1). In order to reverse these trends, a comprehensive approach to tobacco control among adolescents is needed. School-based tobacco use prevention and cessation programming is an integral part of this approach (2). Over the past several decades, state and federal policies have supported tobacco use prevention and cessation programming in schools. As a result, there are now a number of research-validated programs available for wide-scale dissemination in schools. Unfortunately, in 2010 the main source of funding for school-based tobacco and substance use prevention programming, the Safe and Drug Free Schools and Communities (SDFSC) state grants program, was eliminated from the federal budget. In addition, recent changes to the California Health and Safety Code provisions eliminated the annual entitlements for school-based tobacco education funds in California and established a competitive grant process. Due to the high costs associated with adopting research-validated tobacco use prevention curricula (3), school districts without competitive grant funds will struggle to provide their students with tobacco prevention and cessation programs. Given these recent policy changes, it is essential for researchers to understand what factors lead school districts to apply for competitive Tobacco Use Prevention Education (TUPE) funds and use research-validated programs in this new climate. Methods: Data used for this study comes from a cross-sectional survey of 222 California school district administrators and county office of education TUPE coordinators surveyed

during 2011 via a web-based survey. The purpose of this research is to (a) identify the characteristics of districts that have applied for competitive TUPE funds, and (b) explore the socio-ecological factors that influence the use of research-validated tobacco prevention and cessation programs in schools. First, we ran a series of logistic regression models between the dependent variables (applied for competitive TUPE funds, use of research-validated tobacco prevention program and use of approved tobacco cessation program) and each correlate set (i.e., one model per correlate set): community characteristics, organizational factors, normative beliefs, beliefs about tobacco use prevention strategies and funding. Next, independent variables that were significant correlates in the multivariate models by correlate set ($p<.05$) were entered into a final logistic regression model with each of the dependent variables. Results: We found that districts that applied for competitive TUPE funds were more likely to have a program champion, more district coordinator effort devoted to tobacco use prevention, and previously received funding from competitive TUPE funds (p's $<.05$). Districts that reported using a research-validated tobacco prevention program were larger, located in an urban environment, had a district mandate to use a research-validated program, were less overextended in their job, had a program champion and currently received TUPE competitive funding (p's $<.10$), compared to districts that did not use a research-validated tobacco prevention program. Districts that reported using an approved tobacco cessation program had a district mandate to use a research-validated program, had a program champion, had more district coordinator effort devoted to tobacco prevention, believed that student assistance programs (SAP) and tobacco use policies were effective strategies in reducing tobacco use, and had previously received funding from competitive TUPE funds (p's $<.10$) compared to districts that did not use an approved tobacco cessation program. Conclusion: Findings support a multi-level ecological approach to the study of the use of research-validated tobacco prevention and cessation programs in schools. These results should be used to inform policies that affect school districts? use of research-validated tobacco prevention and cessation programming, which will ultimately lead to reductions in negative health outcomes among adolescents. References 1. McCarthy WJ, Dietsch BJ, Dent C, Zheng H, Bono G, Bailey JD, Hanson TL. Evaluation of the In-School Tobacco Use Prevention Education Program, 2005-2006: Technical Findings and Documentation. Sacramento, Ca, 2008. 2. Lantz PM, Jacobson PD, Warner KE, Wasserman J, Pollack HA, Berson J, Ahlstrom A. Investing in youth tobacco control: a review of smoking prevention and control strategies. Tob Control 2000; 9:47-63. 3. Hallfors D, Godette D. Will the `Principles of Effectiveness' improve prevention practice Early findings from a diffusion study. Health Educ. Res. 2002; 17:461-470.

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Strategies for School-Based Tobacco Prevention Efforts

School-based programs typically attempt to prevent smoking by conveying information about prevalence rates, risk factors, and risk estimates concerning tobacco-related disease, as well as

addressing social norms and media influences. Often these school-based prevention efforts yield mixed results. The primary objective of this project was to identify a comprehensive set of topics and strategies for delivery of anti-tobacco messages that can be addressed and implemented in a new school-based tobacco prevention program. In the initial phase of the study, partnerships were solidified with Bay Area elementary, middle, and high schools. Focus groups were conducted with middle and high school administrators, tobacco coordinators, health education teachers, parents, and students. The second phase of the study focused on solidifying relationships with individuals from the CDE, TEROC, and the California Department of Public Health. Key factors involved in youth smoking were identified, existing school-based tobacco prevention and intervention programs were discussed, tobacco education priorities within schools and school districts were discussed, and barriers to implementation of existing and new school-based tobacco prevention and intervention programs were determined. We conducted 16 focus groups containing 62 students (mean age = 14.09), 53 parents and 24 teachers and administrators. Analyses of the focus group data showed that schools did not need another large, comprehensive, research-validated school-based tobacco curriculum. Instead, schools and the CDE are interested in toolkits that can supplement the current CDE-approved tobacco education curricula. In particular, despite data showing that youth development approaches are most effective, there is a dearth of information on how youth development should be implemented and how best to implement specific youth development activities. The youth in the study also noted the need for programming that is more relevant to their needs, desires, and learning styles. Youth also indicated the need for more information on addiction. Both students and parents had limited awareness of school-based tobacco education efforts occurring, and thus noted a strong desire for materials on school-based tobacco policies, tobacco education efforts occurring in the schools, and best practices for speaking to their children about tobacco in conjunction with school efforts. The identified topics and delivery strategies learned from this pilot study will be used to develop a toolkit with a set of modules that will supplement current mandated school-based education. Specifically, we plan on developing, testing, and implementing modules containing youth development strategies, delivery of addiction messages, and materials for parents aimed at providing information about school tobacco policies, school tobacco control efforts, and messages that parents can use to reinforce and append current school messages.

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Cultural Meanings and Contexts of Smoking and Cessation among Korean American Emerging Adults

Introduction: Despite the highest smoking rates and report lower quit rates compared to other Asian groups in the U.S., there is still a lack of knowledge about tobacco use and cessation among Korean Americans (KA). Furthermore, past studies have targeted older smokers. Given the dearth of existing research on these topics, the purpose of this project was to understand specific cultural contingencies and contexts of smoking behaviors and methods of cessation among KA emerging adults (EA). Methods and Participants: This study was a qualitative exploratory investigation using focus groups. Sixty seven KAEA (Mage=20.77, SD=1.77) participated in one of ten focus group sessions, who were recruited from

Orange, Los Angeles and San Bernardino Counties of Southern California. There were more smoker participants (n=34; 50.7%) than non-smokers (n=25; 37.3%); 8 participants (11.9%) were former smokers. There were slightly more male participants (n=36; 53.7%) than females. Almost half of the participants (49.3%) reported being born in the United States. Six of the 10 focus groups were conducted in English; the remaining 4 groups were conducted in Korean. Analysis: Because the purpose of the study was to explore cultural factors relating to cigarette smoking and cessation as participants experience it, we used domain analysis (Spradley, 1979), an inductive analytic method useful for obtaining cultural meanings. One technique used in domain analysis is to identify semantic relationships that arise among identified categories or themes. Findings: Three themes relating to experiences of cigarette smoking among KAEA were identified: 1) Perceived cultural disposition and gender, 2) Access/availability to cigarettes, and 3) Social environment. Additional four themes relating to experiences of quitting among KAEA were identified: 1) Sense of invincibility and denial, 2) Lack of role model and/or pressure to quit, 3) Lack of significant life events, and 4) Negative perception of cessation methods. These themes emerged in discussion of not quitting (i.e., continued cigarette use). Conclusion: Korean American emerging adults, regardless of their acculturation status, perceived cigarette smoking as a cultural norm. They deemed smoking cigarettes part of Korean cultural tradition, thus, that was accepted and simply part of growing up. Smoking seemed largely perpetuated from one generation to the next. Smoking was often described as a social and sentimental endeavor that promoted interaction with other fellow Koreans/Korean Americans. These results suggest that smoking cessation among Korean American emerging adults will heavily depend on modifying culturally-based norms regarding smoking cigarettes. Thus, rather than individually-tailored interventions, family-based or culturally-tailored interventions seem to be most appropriate. Furthermore, given almost every smoker participant stated that they began smoking after a peer offered a cigarette, it may be of additional importance to incorporate methods resisting peer-related influence to begin smoking.

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Waterpipe smoking Behaviors among Arab Americans in San Diego, California

Introduction: The popularity of waterpipe smoking, also known as hookah, narghile or shisha, has recently increased notably in the United States. This is alarming since waterpipe smoking involves tobacco, which is associated with potential health risks. A waterpipe smoker inhales tobacco smoke that passes through a partially-filled water container. The charcoal-heated tobacco used in waterpipe smoking is mainly a mixture of crude types of tobacco fermented with molasses and fruits. The purpose of this study, named Al-Wikaya, was to investigate the patterns and determinants of waterpipe smoking among Arab Americans residing in San Diego, California, a rapidly growing minority group. b) Methods: During a two-year period, 2006 through 2008, a convenience sample of 459 adult Arab American waterpipe smokers completed a self-administered survey. Study participants were recruited from Middle Eastern grocery stores and restaurants, churches and mosques. Flyers, screening forms, questionnaires and study materials were provided in English and Arabic. The waterpipe questionnaire

was designed using the Behavioral Ecological Model. c) Results: The mean age of the study participants was 28.4 years (SD=11.53); 58.8% (n=270) were males and 38.3% (n=176) were females. About one-half (55.6%, n=255) reported having less than a college degree; 67.8% (n=311) were not married, and 64.1% (n=294) were employed. About one-half (54.5%, n=250) were born in an Arabic country, 35.9% (n= 165) were born in the United States, and 3.9% (n=18) were born in other countries. A total of 41.3% (n=178) reported that they first tried smoking a hookah at an age younger than 18 years, and 34.1% (n=147) reported that they smoked their first hookah at age younger than 18 years. Regular waterpipe smokers were comprised of daily smokers (9.6%, n = 44), weekly smokers (26.8%, n=123), and monthly smokers (25.9%, n=119). Occasional waterpipe smokers (37.7 %, n=173) reported smoking at least once a year but less than monthly. d) Conclusions: Findings from the logistic regression analyses revealed that compared to occasional waterpipe smokers, regular waterpipe smokers were more likely to smoke more than one hookah head (~10grams tobacco/head) on the day they smoke (Adjusted odds ratio [AOR]=2.82; 95% CI, 1.64-4.84), smoke more than 60 minutes on the day they smoke (AOR=3.08; 95% CI, 1.88-5.04), smoke during weekdays (AOR=3.83; 95% CI, 1.70-8.61), have smoked during the past seven days (AOR=9.66; 95% CI, 6.10-15.31) and 30 days (AOR=4.59; 95% CI, 2.54-8.29), have ever been to a hookah lounge (AOR=2.23; 95% CI, 1.38-3.62), and currently own a hookah at home (AOR=2.76; 95% CI, 1.28-5.97). This poster presentation represents the first of a series of manuscripts in the area of waterpipe smoking among Arab Americans. Learning about waterpipe smoking behaviors will inform future research and tailored intervention designs to curb waterpipe smoking among Arab Americans.

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**Community Health for Asian Americans

Tobacco Environment for Southeast Asian American Youth: Results of a Pilot Participatory Research Project

Introduction: Because Southeast Asians have been associated with some of the highest rates of smoking of U.S. populations and because youth have been shown to be highly responsive to participatory environmental tobacco control efforts, our pilot CARA--a collaboration between PRC scientists and youth participants and staff of the Southeast Asian Young Leaders (SEAYL) youth development program in Richmond, CA--aimed to develop youths critical awareness of tobacco in their social environment. Methods: The project utilized a participatory research approach. The youth were provided with trainings in tobacco issues including local tobacco control policies, political processes in their community and research methods, and engaged in several forms of data collection: (1) observations in 25 retail outlets in Richmond proximal to their homes, schools and the SEAYL program office, in which they recorded percent and kinds of tobacco ads visible inside and outside stores and presence of promotional items and signs; (2) a brief survey of Richmond residents (n= 73) to assess use of and exposure to tobacco products; and (3) PhotoVoice, in which youth participants took photographs of tobacco in their social environment, including in and around retail outlets. Scientists trained the youth to manage and analyze the survey and outlet data; program staff facilitated discussions of the PhotoVoice images and develop narrative descriptions of selected photographs; and scientists and program staff worked with the youth

to assess and interpret the results across data sets. Summary: Through their research, SEAYL participants identified high availability of and exposure to tobacco products and particular mentholated cigarettes. They found that stores were advertising tobacco products in violation of some city ordinances; and that tobacco products were heavily marketed to youth. As a result of their new awareness, participants developed a hip-hop rap about tobacco and advocated for a ban on mentholated cigarettes to Richmond city council. Participants described speaking out against menthol to friends as well. Conclusions: Participatory research can be an effective means to engage at-risk youth in tobacco control efforts.

Pamela Ling, University of California San Francisco

Younoki Lee, PhD Jeff Jordan, MA Torsten Neilands, PhD Stanton Glantz, PhD, University of California San Francisco (Lee, Neilands and Glantz) Rescue Social Change Group (Jordan)

Social Branding to Decrease Smoking among Young Adult Hipsters in California

Objective: Young adults (age 18-25) have disproportionately high smoking rates. Commercial market segmentation strategies can be used to identify and reach high risk subgroups for interventions. We evaluated the effectiveness of an innovative social marketing intervention to decrease smoking among young adults in bars in San Diego. Methods: Repeated cross sectional surveys of random time-location samples of the young adult bar-going community in San Diego, California were collected at baseline and three years of follow up. Hipsters were defined as young adults who mostly strongly identified with images of members of the alternative music scene, and who attended these venues most frequently. Hipster opinion leaders were a subgroup that prioritized their social life, both by personality traits and a higher frequency of going out to bars and staying out late. Results: A significant decrease in current (past 30 day) smoking was found starting in year 2 and sustained through year 3 (FU3) in the total random sample of young adults attending Hipster bars. Smoking in the entire bar sample decreased from 56.4% to 46.5 at FU3 .

Arnab Mukherjea, Department of Microbiology, University of California, Davis

Enhancing Validity of a South Asian Tobacco Survey Module

INTRODUCTION The objective of this study is to validate a novel instrument to measure culturally-specific tobacco use among South Asians in California. Standardized population-level survey instruments often neglect to capture appropriate contexts and metrics of at-risk behavior. For South Asians specifically, the use of tobacco is largely limited to indigenous tobacco products which don’t include cigarettes and mainstream smokeless products. These culturally-specific products are not assessed in traditional tobacco surveillance, and neither are the unique social and cultural influences on product use. METHODS Formative qualitative data from two large South Asian ethnic enclaves was used for item development. Existing domestic and international surveys were utilized as templates for survey stem and response choices. New survey items and novel constructs were cognitively tested in seven focus groups (n=46) in the two enclaves to refine the initial instrument. Key informant interviews with methodological and substantive experts (n=14)of which half were of South Asian descent and

community members (n=22) were used to establish face and content validity, determine feasibility of use, and refine the final instrument for population-level surveillance. RESULTS Respondents in cognitive interviews emphasized that featured products must be surveyed independently to utilize the correct terminology. Each product had a distinct set of potential socio-cultural correlates of use not found on other standard surveys (e.g., use for religious purposes, celebration of cultural events and holidays, socialization with family and community). Other unique factors include perception of health benefits, maintenance of traditional practices (e.g. use for religious purposes, offering during social gatherings), expression of ethnic identity (e.g. public celebration of cultural events and holidays), and internalization of a ?model minority? ascription. The new measures were comprehensible by a diverse group of South Asians in the U.S. and the survey was feasible to use in this community, with an average completion time of 28.5 minutes. To reduce potential respondent confusion, community members recommended the including visual depictions of each product. Moreover, analysis of qualitative data generated an overwhelming consensus that respondents not be questioned about opinions, beliefs, and attitudes about culturally-specific products not used; this finding was important to reduce burden and improve completion rates. Currently, data is being collected throughout California using innovative collection strategies (time location sampling and electronic technologies) to determine point-estimates of prevalence and associations with novel predictors. CONCLUSIONS Measures validated in the mainstream U.S. population do not function equivalently in special populations for which the cultural context of tobacco use differs. This study forms the foundation for a formal pilot-test to generate population-level estimates in California, measure appropriate social and cultural predictors, and determine associations with use of particular culturally-specific products. To ensure that future efforts are effective in addressing tobacco-related disparities, risk factor instruments must capture the unique contexts of behavior found in use among diverse communities.

Anthony Nguyen, Vietnamese Community Health Promotion Project

Nguyen, A., Wong, C., Le, K., Tsang, I., Burke, N., McPhee, S., Nguyen, T., & Tsoh, J., University of California, San Francisco (UCSF); UCSF Division of General Internal Medicine; UCSF Department of Psychiatry; UCSF Helen Diller Family Comprehensive Cancer Center; and Southeast Asian Community Center (SEACC)

Media Communication Strategies to Reduce Smoking in Vietnamese Men

Background: Vietnamese American men have the highest smoking prevalence among Asian Americans. The 2008 California Vietnamese Adult Tobacco Use Survey revealed that half of Vietnamese smokers had no intention to quit in the near future and less than one in three smokers had used cessation resources such as medications or telephone quitline (Tsoh et al., 2011). Objectives: The goals of this study sponsored by the Cornelius Hopper Diversity Supplement Award are to 1) identify knowledge gaps in the Vietnamese community related to low quit intention and underutilization of cessation resources, and to 2) explore media communication strategies to reduce smoking in Vietnamese American men. Methods: We conducted sequential, qualitative research involving semi-structured dyadic interviews with 9 smoker-family pairs and follow-through with in-depth interviews with each individual participant. Participant ages ranged from 23 to 65, included 5 current daily smokers and 4 former smokers (all

males), and 9 family members living in the same houshold (8 females, 1 male). Results: Preliminary analyses suggested family conflicts caused by smoking were common but tobacco-related issues were rarely discussed among family members. Participants were appreciative of having opportunities to express their views of tobacco use and its impact on self and family. Interview data further revealed knowledge gaps in risks of tobacco specifically of second and third hand smoke exposures; rewards or benefits of quitting; and resources for quitting. Findings underscore the importance of involving families and addressing the relevant knowledge gaps to advance tobacco control targeting the Vietnamese American community. The use of media to encourage and engage community in discussing tobacco-related iissues and to increase community openess to use cessation resources is a promising tobacco control effort. Next Step: Being informed by the qualitative findings, we are in the process of producing a three 30-minute TV interview series. The Cornelius Hopper Trainee (A.N.) is a host and producer of a Vietnamese language TV show that reaches 60 to 80 thousand Vietnamese in the San Francisco Bay Area. The shows will be broadcast on a local ethnic-media channel and be made available on Youtube. Based on the qualitative findings, the interviews will involve story telling by current former smokers and their families, and interviews with local health experts. The key discussions and messages will be structured around the 5 Rs (risks, rewards, roadblocks, relevance, and repetition) as guided by the Clinical Practice Guideline (Fiore et al, 2008) for increasing smokers motivation to quit smoking and readiness in using cessation resources. Viewer opinions will be collected to further inform culturally appropriate and effective media strategies to mobilize the Vietnamese American community in tobacco control efforts.

Judith Prochaska, University of California, San Francisco, Department of Psychiatry

Sebastien C. Fromont, MD, Alan K. Louie, MD, Karen Suchanek Hudmon, DrPH, RPH, Janine Cataldo, PhD, MSN, Sharon M. Hall, PhD, University of California, San Francisco, Department of Psychiatry, School of Pharmacy, & School of Nursing

Dissemination and Implementation of an Evidence-Based Tobacco Treatment Curriculum for Psychiatric Trainees

Background: Despite high rates of tobacco use and tobacco-related morbidity and mortality among individuals with mental illness, surveys suggest psychiatrists rarely treat tobacco use and only half of psychiatric residency programs provide didactics on such treatment, with a median length of 1 hour (Prochaska et al., 2006). We developed the Psychiatry Rx for Change curriculum to address this gap and previously demonstrated positive educational outcomes sustained at 3-months follow-up with 55 psychiatric residents (Prochaska et al, 2008). Purpose: With the aim of improving competency in tobacco-treatment by psychiatric trainees, the current study evaluated the dissemination and implementation phase of Psychiatry Rx for Change, a 4-hour, tobacco-treatment curriculum for psychiatric residencies and graduate psychiatric nursing programs. Methods: Diffusion of Innovations theory (Rogers, 1995) and the RE-AIM framework (Glasgow & Emmons, 2007) guided dissemination and implementation. Faculty from psychiatric residencies (n=28) and graduate psychiatric nursing programs (n=15) from the Western U.S. attended a one-day Psychiatry Rx for Change train-the-trainer event in San Francisco, CA. Evaluations included faculty pre/post-training and follow-up surveys, online

resident/student evaluations, and tracking of registrants and file downloads on the curriculum website: http://rxforchange.ucsf.edu. Results: Faculty participants' rating of their overall ability to teach tobacco treatment increased from pre- to post-training.

Louise Rohrbach, University of Southern California Department of Preventive Medicine Institute for Prevention Research Keck School of Medicine

Steve Sussman, Ping Sun, Melissa Gunning, Thalida Arpawong, University of Southern California Department of Preventive Medicine Institute for Prevention Research Keck School of Medicine

Effectiveness Evaluation of the 'I Decide' Program

Objective. The primary aim of this project was to evaluate the effectiveness of 'I Decide,' a promising teen cessation program for high school students currently in use by a number of school districts in California. Background. California high school students continue to smoke at alarming rates, despite a significant decline in tobacco use prevalence since the late 1990's. For the most part, programs developed for teen tobacco use cessation have been few in number, most have been poor in research design, and most have been lacking in program development details. Very few evidence-based teen cessation programs, or programs that have evaluated with the use of rigorous scientific methods and data analyses, are available. The present study addressed this gap by using a randomized controlled design to evaluate a promising educator-developed teen cessation program. Methods. A total of 14 regular and continuation high schools in Los Angeles County was recruited to participate in the randomized two-group study. Within each school, student smokers were invited to participate. After providing assent and parental consent, a total of 214 students were randomly assigned to either the intervention or delayed intervention condition. The intervention consisted of 11 group sessions that were conducted once a week during school hours and led by a trained facilitator. Students in the delayed intervention condition were wait-listed to receive the intervention approximately 8 months later. Students in both conditions were administered a pretest prior to the group sessions, an immediate posttest after the sessions, and a 6-month follow-up. The self-report measures were validated by measurement of saliva cotinine. Results. The mean age of participants was 16.2 years. The sample included 52% males; 68% were Latino, 9% were white; 2% were African American, 6% were Asian, 13% were mixed ethnicity, and 2% were other ethnicity. At baseline, participants had smoked an average of 2.5 cigarettes during the last 24 hours. A comparison of quit rates showed no significant differences between the intervention (24.4%) and delayed intervention (26.4%) conditions at immediate posttest. This lack of program effect was maintained at the 6-month follow-up (24.4% vs. 27.6%; non-significant). Comparisons on variables that were hypothesized mediators of change showed that the intervention group had significantly greater increases in situational self-efficacy and coping skills, and reductions in situational temptations.

Hai-Yen Sung, Institute for Health & Aging, School of Nursing, University of California, San Francisco

Wendy Max, Ph.D.1, Judith J. Prochaska, Ph.D., M.P.H.2, Yanling Shi, M.S.1, Michael K. Ong, M.D., Ph.D.3, 1 Institute for Health & Aging, School of Nursing, University of California, San Francisco, 2

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Healthcare Utilization and Health-Related Quality of Life among Smoking and Nonsmoking Adults with Serious Psychological Distress

Introduction: The purpose of this study was to examine the impact of smoking on healthcare utilization and health-related quality of life (HRQOL) among persons with serious psychological distress (SPD). Methods: We analyzed a state-representative sample of 4,010 adults aged = 18 years who had SPD in the past 12 months using the 2007 California Health Interview Survey data. Persons with SPD were identified using the K6 scale, a clinically validated psychological screening instrument. Four healthcare utilization measures were examined: mental health prescription medications use, mental health professional visits, ER visits, and general medical doctor visits. Six HRQOL measures were also examined: whether or not a respondent's emotions had interfered a lot with work performance, household chores, social life, and family/friends relationship, as well as poor/fair health status and disability days. Results: In 2007, among the California adults with SPD, 28.5% were current smokers and 20.0% were former smokers. Compared to never smokers, current smokers had more mental health professional visits (9.6 vs. 4.6 visits) and general medical doctor visits (8.2 vs. 7.3 visits), and were more likely to take mental health prescription medications (42% vs. 32%), visit ER (44% vs. 32%), and report worse HRQOL (52% vs. 39% for work performance; 57% vs. 44% for household chores; 62% vs. 54% for social life, 54% vs. 45% for family/friends relationship; 43% vs. 35% for poor/fair health; 81 vs. 49 days for disability days) in the past 12 months. After controlling for other covariates, these differences remained significant except for general medical doctor visits and two HRQOL measures (social life, and poor/fair health). The multivariate regression results show that former smokers had more general medical doctor visits (by 3.2 visits; $P < 0.05$), and were more likely to report worse HRQOL on three measures (adjusted odds ratios [AOR] = 1.37, 95% CI = 1.03-1.82 for household chore; AOR = 1.38, 95% CI = 1.01-1.90 for social life; additional 26.0 disability days, $P < 0.05$) in the past 12 months compared to never smokers. Conclusions: Among persons with SPD, smoking is associated with significantly greater mental healthcare utilization and worse HRQOL. Former smokers' elevated healthcare utilization and worse HRQOL likely reflect the previously documented finding that people often quit smoking once they become very ill. Our findings underscore the importance of identifying public health policies to prevent and treat tobacco dependence among this subpopulation.

Zul Surani, University of Southern California

Bruce Allen, Jr., DrPH., Charles R. Drew University of Medicine and Science. Jennifer Beth Unger, Ph.D., University of Southern California, Institute for Prevention Research Liz Barnett, M.S., University of Southern California Tess Boley Cruz, Ph.D., University of Southern California, Institute for Prevention Research

Developing a Menthol Centric Smoking Cessation Intervention

African Americans died more often from heart disease, cancer and stroke compared to other racial and ethnic groups in the U.S. in 2005. This may be due to their unique smoking pattern that includes a

preference for menthol cigarettes. Data on African Americans and menthol use warrants the development of cessation intervention programs that can help this population quit. We piloted tested a single session, Motivational Interviewing program for African American menthol smokers. Our goal was to explore whether a brief intervention would be effective, given the difficulty of getting African American smokers to complete a full series of quit smoking classes. We initially conducted eight focus groups (N=81) to expand our understanding of the factors that encourage and discourage smoking cessation among African American menthol and non-menthol smokers. Participants were recruited through a market research company that promoted the study through various internet and community sites. We found that most older smokers want to quit, but needed help with a quit plan and strategies tailored to their personal situation. Younger smokers are less likely to consider quitting as highly important, and may need more help identifying personal reasons to be more motivated to quit. Focus group results showed that Motivational Interviewing can possibly serve as a useful stand-alone technique to help African American smokers move toward readiness to quit or as an adjunct to existing evidence-based programs for both younger and older menthol smokers. Data from the focus groups was used to inform the development of a single-session brief Motivational Interviewing program for smoking cessation among African Americans to address menthol as well as general smoking cessation issues. This resulted in a pilot motivational interviewing program that was tested with 25 (60% of our sample of 40) African American menthol and non-menthol smokers. The feasibility and acceptability of this intervention was also examined among participants. The intervention was one hour long, conducted in-person and in local community settings. Participants were recruited through referrals from providers, community agencies and previous focus group participants were given the option to participate. In 100% of the cases, each intervention was completed in its entirety and participants helped to personally assess the importance of quitting, their readiness to quit and their confidence in quitting. It was followed by assistance with building a tailored action plan to quit smoking and the consumer testing of an informative brochure designed to support their quitting. Each participant completed immediate pre/post intervention assessments. According to these pre/post assessments, in 44% of the cases, the participants maintained their higher than average levels of readiness to quit (between 8 or starting to think about quitting to 10 or taking action to quit). Results in 32 % of cases showed a 2 or more point gain in their readiness to quit after participating in the intervention. Eighty percent of the participants felt that their tailored quit plan, action components of their quit plan and effects of the interview will make it easier for them to quit smoking. After 30 days, 11 participants were called to complete a follow-up survey to measure effects of the intervention on short-term outcomes. Nine participants responded with the following results: a) 100% were motivated to quit b) 80% maintained self-efficacy to quit c) 100% maintained their intention to quit and d) 9% had entirely quit smoking. After completing the intervention and follow-up with 100% of our sample (N=40), we can make recommendations for a complete study of a brief motivational interviewing program for African American smokers, including the effective use of a consumer tested menthol cessation brochure/small media. Initial findings show, that Motivational Interviewing is a promising strategy to engage African American smokers to move toward quitting. By quitting smoking, African Americans would reduce their uneven burden of tobacco related diseases, such as heart disease, cancer and stroke.

Icarus Tsang, Cornelius Hopper Research Fellow

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Gum, the Patch, and Candy: NRT Understandings and Usage among Vietnamese Men

Background: One in 3 Vietnamese Americans (36%) reside in California. Today, nearly 2 in every 100 Californians are Vietnamese. The decline in smoking prevalence in California has not translated equally to all ethnic subgroups, particularly among Vietnamese men. Current smoking prevalence rates range from 25% to 35% among Vietnamese American men and below 1% among Vietnamese women. Nicotine replacement therapy (NRT) including nicotine patch, gum and lozenge are accessible over-the-counter and have been shown to be effective (Fiore et al., 2008), however, they remain underutilized by many smokers including Vietnamese smokers. Understanding and addressing the factors that contribute to underutilization are necessary to increase usage of evidence-based smoking cessation aids such as NRT. Methods: In-depth qualitative interviews were conducted with 9 smoker-family pairs (including 5 current smokers, 4 former smokers, and 9 family members of the smokers), followed by individual interviews with each participant. Interviews were conducted in Vietnamese, recorded, translated and transcribed into English for analysis. Preliminary analysis of paired interview transcripts resulted in tailored questions for individual interviews. Two research team members coded all interview transcripts and the research team met monthly to discuss emergent themes. Results: Preliminary analysis revealed that most interviewees seemed to have heard of NRT as some referred to gum, patch, or candy that they used to support their quit attempts. Several reported sending to Vietnam for gum preferred to that available in the United States. Participants expressed mixed beliefs about the helpfulness of NRT for stopping smoking; most participants, both smokers and family members viewed will power as more important than the use of NRT or other methods. NRT in its various forms served more as a reminder or form of psychological support. Participants varied in their understanding of how to use NRT; instructions were not consistently followed but rather participants used NRT according to their own preferences. Variation in usage was linked to concerns about over exposure to nicotine. Conclusion: The belief in will-power and personal responsibility for stopping smoking keeps some Vietnamese men from accessing NRT as a tool in their quit attempts. Those who do use NRT, often use them incorrectly. Our findings indicate the importance of patient education on smoking cessation medications and NRT use.

Maya Vijayaraghavan, Moores Cancer Center, University of California, San Diego

Martha White, MS; Karen Messer, PhD; John Pierce, PhD, Moores Cancer Center; University of California, San Diego

The Effects of Cigarette Prices and Smoke-free Homes on Smoking Behaviors among Low-income Smokers

Background: Cigarette prices differ across regions in the United States (U.S). We hypothesized that price-sensitivity would vary by income level across regions in the U.S. We examined the effects of cigarette prices on average daily cigarette consumption (cigarette consumption) by poverty status and region, and identified factors associated with price paid for daily cigarette habit. Methods: Using the Tobacco Use Supplement to the Current Population Survey (TUS-CPS, 2006-2007), we examined smoking behaviors among current smokers (daily and non-daily) = 18 years of age. Using self-reported price per pack, we determined the average reported pack price for each state, and categorized them into three price groups using cut points of $4.50 and $3.20. Respondents were placed in four groups by self-reported income and household size: a) < 100% of the federal poverty level (FPL), b) 100%-199% FPL, c) 200%-299% FPL, and d) = 300% FPL. Using linear regression, we identified factors associated with the price individuals paid for their daily cigarette habit. Results: Consumption was slightly lower in the lowest income level compared to other levels: < 100% FPL = $3.99 (95% CI 3.92, 4.07), 100%-199% FPL = $4.09 (95% CI 3.99, 4.17), 200-299% FPL = $4.06 (95% CI 3.99, 4.13), and 300% FPL = $4.36 (95% CI 4.31, 4.42). Across all income levels, average consumption was inversely related to average state price. In adjusted linear regression analysis, there was no association between the price individuals paid for their daily cigarette habit and income level. Individuals living in states with a high cigarette price paid a $1.00 more (95% CI 0.86, 1.07) for their daily cigarette habit compared to those living in states with a low price. People who lived in homes with smoking restrictions paid a $1.00 less (95% CI -1.05, -0.90) for their daily cigarette habit than those living in homes without any restrictions. The proportion of people with a smoke-free home was associated with income level with those living below the FPL having the fewest smoke-free homes.

Julie Waters, University of California, San Francisco

African Americans: NRT or Alternative Medicine for Cessation (Instrument Development Phase)

Yerger, Valerie, University of California, San Francisco

Objective: This project explored the acceptability of NRT and any perceived barriers that influence its use among African Americans. This project also explored the use of Complementary and Alternative Medicine (CAM) as an aid to quit smoking. An instrument was designed and tested to capture specific issues related to African Americans and the use of NRT and CAM as tobacco cessation aids. Methods: This is a multimethod study utilizing focus groups in phase one and instrument development in phase two. Drawing on data from the focus groups, we generated culturally appropriate questionnaire items to capture specific issues relating to African Americans and their perceptions surrounding smoking cessation. We refined the instrument to measure African American adults perceived obstacles to the use of NRT and knowledge of, usage patterns, and perceived effectiveness of NRT and alternative therapies such as home remedies, prayer and spiritual healing, or relaxation techniques for tobacco cessation. To determine the feasibility of the instrument, we pilot tested it among 20 respondents (14 smokers and 6 current smokers), pooled from a convenience sample. Results: We identified themes that helped to devise questions that would accurately document smoking behaviors, methods used for tobacco cessation (both traditional and alternative medicine modalities), tobacco cessation experiences (both traditional and alternative medicine modalities) and cessation strategy beliefs/philosophies among

African Americans. Questions regarding methods used for tobacco cessation appeared to accurately capture respondents methods to quit smoking, experiences related to trying to quit smoking and beliefs about trying to quit smoking. Initial analysis of survey results suggests that most responses successfully captured the variability within even a small population. Conclusion: Given the disproportionate burden of tobacco-related diseases that affect African Americans, exploring why they are less likely to use NRT may provide additional insight into the obstacles interfering with smoking cessation. Exploring potential uses of complementary and alternative therapies may offer even more insight as to how we may in a culturally-appropriate way better assist African Americans to quit smoking and remain tobacco-free. Though instruments may exist to capture perceptions about NRT and CAM in the general population, the instrument items developed in this study are more relevant to African Americans and their perceptions surrounding smoking cessation.

Program Abstracts

Posters Displayed on April 11 and April 12, 2012

Track 1: Tobacco Control Policy Advocacy and/or Media Strategies

Janie Burkhart, Project Director, Santa Clara County Public Health
Francis Capili, Health Education Specialist, Santa Clara County Public Health
Nicole Coxe, Health Planning Specialist, Santa Clara County Public Health

The Role of Political Champions in Passing Tobacco Control Ordinance

Background According to local Santa Clara County (SCC)law enforcement data, the average illegal tobacco sales rate in the County is 7% with some cities having rates higher than 14%. County wide, 36% of schools are currently located within 1000 feet of a tobacco retailer. One quarter of middle school youth and two-thirds of high schoolers in SCC report that it is easy to get cigarettes. Second hand smoke causes more than 3000 lung cancer deaths in the U.S. annually. The Surgeon General warns that there is no safe level of exposure to second hand smoke. Methods On March 2, 2010, the SCC Board of Supervisors (BOS) sent a referral to the Public Health Department (PHD) requesting an in depth report on possible tobacco control policy in the County. SCC Public Health staff worked closely with the BOS President's staff, County Counsel, the Sheriff's Office; Department of Environmental Health and the County Planning Department in the preparation of this report. The BOS President and his staff reached out to potential advocates and opponents and involved Public Health in these meetings and discussions. Additionally, the BOS President's office brought in scientific experts to testify on health effects related to second hand smoke. Results In order to reduce youth access to tobacco products and protect residents from second hand smoke exposure, on November 9 and November 23, 2010, SCC passed a combination of three distinct tobacco control ordinances: smoke free multi-unit housing; smoke free outdoor areas including parks, service areas and outdoor dinning; and a tobacco retail permit program that includes retailer zoning limitations near schools. Conclusions Passage of this comprehensive suite of tobacco control ordinances would not have been possible without the leadership and political acumen of the then County Board President, Ken Yeager. The existence of a close working relationship with the Board Member and his staff prior to beginning this process was critical. Based on these relationships, it was possible to work out numerous issues and obstacles behind the scenes so that the final ordinances presented to the Board for a vote were already well vetted. A wealth of existing staff expertise and other supporting resources such as Public Health Law and Policy provided the infrastructure to respond when the opportunity arose to educate the BOS about the value of tobacco control policy in protecting the public's health.

Kim Homer Vagadori, Project Director, California Youth Advocacy Network (CYAN)

Taking Tobacco Out of Higher Education

Tobacco control professionals, student advocates, and college representatives have been working on making California's colleges and universities tobacco-free for more than 14 years. Advocates have found great success over the years and today, more than 91 of the 145 public colleges have a tobacco use policy that is stronger than CA state law. However, with all the successes, there is also a lot of work to be done to make all colleges, whether public or private, two-year or four-year, completely tobacco-free. This presentation will highlight the smoke-free and tobacco-free policy trends on California college and university campuses. Participants will learn what colleges have strong tobacco use policies, what schools are currently working on new policies, and how tobacco control professionals can work with or support their local college in going completely tobacco-free. Information will also be shared on statewide tobacco-free college initiatives being led or supported by the California Youth Advocacy Network (CYAN) and COUGH, CYAN's college student advocacy coalition. Presenters will discuss effective strategies used to advocate for policy change on campus as well as innovative ways to implement new policies. Furthermore, information on policy enforcement, the impact of AB 795 on colleges, and how local colleges are using AB 795 to enforce their policies will be shared. At the conclusion of this session, participants will have increased knowledge of tobacco-free policy activities on California college and university campuses; a better understanding of why colleges should adopt 100% tobacco-free policies; and information on effectively adopting, implementing, and enforcing smoke-free and tobacco-free college policies.

James Jo, Health Educator, Riverside County Department of Public Health

Voluntary Smoke-free Outdoor Dining Policies: Lessons Learned and Barriers/Challenges to Adoption and Implementation

Over the past several years, numerous cities in California have adopted smoke-free outdoor dining ordinances. Restaurants with smoke-free outdoor dining establish a healthier environment for diners without the exposure of secondhand smoke. With the passage of outdoor smoke-free ordinances, there has been much literature on the topic of outdoor smoke-free policy enactment and legislation. However, little information exists on the adoption and implementation of local, voluntary smoke-free outdoor dining policies. The intent of the abstract is to discuss the issues related to the adoption and implementation of voluntary smoke-free outdoor dining policies, including lessons learned, what worked well and barriers and challenges to implementation. An objective of the Tobacco Control Project at the Riverside County Department of Public Health is to have a minimum of 150 restaurants to adopt and implement a voluntary policy, by June 2013, which designates outdoor dining areas as smoke-free for the Cities of Riverside, Moreno Valley, and Corona. The process for the policy adoption encompassed the following steps. TCP staff compiled a database of all target area restaurants with outdoor dining patios to track policy progress. Then, the pre-observational surveys were conducted to evaluate the smoking activities before and after the adoption of the policies. Smoke-free Outdoor Dining packets were mailed out to targeted restaurants. The packets contained a letter introducing the project, benefits

of adopting the policies, a list of cities with smoke-free outdoor dining ordinances, a model policy, and a response card with return envelope. Following the mailing of the packets, face to face meetings were conducted with restaurant owners/managers to inform and encourage the adoption of the policies. Finally, the certificates of appreciation were presented to restaurants that adopted the policies as well as placement of their names on a paid advertisement and the program website. Lessons learned include: 1) importance of persistency with owners/managers (required on average 2-3 face-to face follow-up meetings); 2) importance of establishing a rapport with owners/mangers; 3) effectiveness of incentives on adoption and implementation of the policies (certificate of appreciation and paid advertisement); 4) follow-up visits to monitor compliance and for technical assistance. Barriers/challenges include: 1) the fear of losing business by banning smoking; 2) perception by the owner/managers that individuals have choice to smoke or not to smoke; 3) the feasibility of enforcement by the owners/managers.

Natasha Kowalski, Sr. Health Educator, Santa Cruz County Health Services Agency
Andrea Silva, Health Educator, Santa Cruz County Health Services Agency

Turning Bad News into Good News: Turning the Latest Headline into Your Message

The Santa Cruz County Tobacco Education Coalition struggled for over 7 years to garner attention for tobacco retail licensing (TRL). Two recent events hit the front page of the local papers, and both could have set the Coalition further back. Instead, Coalition members and staff capitalized on the events to create enthusiasm for TRL. In one case, local elected officials threatened to no longer advocate for tobacco control policies because of their dissatisfaction with the City's stagnant tobacco grade. In the other case, an illegal weapon seizure could have directed the elected officials attention away from tobacco prevention. In both instances, the Coalition was able to tie the event to TRL and generate extensive media coverage supporting TRL. The Coalition reinforced the media coverage by speaking during oral communications and awarding the city officials for past tobacco-control policies. As a result, new community partners were recruited, and elected officials became eager to be the first jurisdiction in the county to adopt TRL. Ultimately, two jurisdictions adopted TRL policies, and at least two more jurisdictions are considering TRL. One lesson learned from this experience is the power of media advocacy in advancing local tobacco control policies. By finding ways to make TRL newsworthy, the Coalition recruited new community partners who became influential TRL advocates, and the Coalition was able capture the attention of elected officials for youth access issues. Another lesson learned was the influence that each jurisdiction has on each other. Once TRL became a pressing issue, each jurisdiction was eager not to be left behind, but at the same time they did not want to be the only one to adopt a TRL ordinance.

Nathan Read, Tobacco Education Program Coordinator, Shasta County Health & Human Services

Smoke-free Beach Policy at Whiskeytown National Recreation Area

Whiskeytown National Recreation Area (NRA) provides a wealth of resources for visitors to enjoy, including historical sites, trails for hikers, bikers, and equestrians, campgrounds, and more. But the centerpiece of Whiskeytown NRA is Whiskeytown Lake, a 3,458 acre lake that provides visitors with opportunities for all manner of water-based recreation. Roughly 800,000 visitors enjoy Whiskeytown

NRA annually. The nearest metropolitan area to Whiskeytown NRA is Redding, CA (Pop. 90,521), which is located just 8 miles away. The use of cigarettes and other tobacco products in a public setting can negatively affect some visitor's experience through exposure to second-hand smoke, the disagreeableness of the smell of tobacco smoke, and cigarette butt litter on the ground. In the spring of 2009, in an effort to improve the experience for park visitors, the managers of Whiskeytown began to consider prohibiting smoking at the area's four designated swimming beaches. In order to gauge public sentiment toward a no-smoking policy and to help guide an informed decision on the matter, the management of Whiskeytown NRA worked with Shasta County Health and Human Services to develop a plan to survey park visitors. During the summer of 2009, Public Health staff surveyed 435 individuals at Whiskeytown NRA's designated swimming beaches in order to assess how park visitors felt about a possible implementation of a no-smoking policy. Due in major part to the support for a no smoking policy voiced in the survey and following a 30-day public comment period, Whiskeytown NRA management implemented a no smoking policy at the four designated swimming beaches effective May 1, 2010. Whiskeytown NRA and Shasta County Health & Human Services conduct a follow-up survey after the no smoking policy was implemented (during the summer of 2010). The survey conducted during the summer of 2010 showed that the policy was effective at reducing cigarette smoke and cigarette butt litter, and this reduction serves to enhance the visitor experience. Support for the no smoking policy grew after it's implementation.

Guadulesa Rivera, Program Coordinator, Glendale Adventist Medical Center

Utilizing Art and Advocacy to Reduce Youth Access to Tobacco

Tobacco use is one of the challenges that youth face, particularly when tobacco products are becoming more addictive, attractive, and accessible to youth. According to a 2010 U.S. Surgeon General report, the tobacco industry has redesigned cigarettes to include filter holes that allow cigarette smoke to be inhaled more deeply into the lungs, and added ammonia that exacerbates nicotine addiction. The industry has also made tobacco products resemble candy by adding flavoring and selling them in candy-like packaging. Furthermore, the CDC reports that 1 in 5 youth identified as current smokers directly purchased their own cigarettes from retailers. In 2011, Glendale Adventist Medical Center (GAMC) launched the Youth Art and Advocacy Program in Duarte, California to protect youth from tobacco access, after a successful string of policy efforts in other communities. GAMC conducted a five-phase policy campaign model that included a community needs assessment (youth access surveys, community resources assessment); policy campaign strategies (strong media campaign, educating key opinion leaders); coalition building / advocacy; policy implementation; and evaluation. GAMC surveyed 754 Duarte residents who expressed support for tobacco control in their community, and collected 91 petition signatures for support of smoke-free healthy lifestyles. GAMC also found that 13% of Duarte merchants were willing to sell tobacco to minors, more than double the state's average (5.6%). GAMC organized a coalition of youth and adult residents, community agencies, educators, and other community leaders to develop strategies for tobacco control, resulting in the Youth Art and Advocacy Program. Teen students, referred by Duarte schools and community agencies, participate in a five-week after-school program, utilizing mixed media instruction and hands-on creative art making as an outlet of expression for students. The objective is for students to learn how art supports civic engagement and

community empowerment. Students have conducted presentations to the city council, community leaders, and at school assemblies. They also have developed a major anti-tobacco public service announcement for the local newspaper. Besides art and advocacy, students learn about the dangers of tobacco and how the tobacco industry's visual marketing campaigns have influenced youth. The program also fills a gap of needed art and health programs eliminated from school curriculums because of budget cuts. This innovative program has proven an effective strategy in building awareness, leadership and advocacy skills among youth through the power of art, as well as providing tobacco control education.

Travis Satterlund, Evaluation Associate, Tobacco Control Evaluation Center
Jeanette Treiber, Tobacco Control Evaluation Center
Robin Kipke, Tobacco Control Evaluation Center
Diana Cassady, Tobacco Control Evaluation Center

The Challenges and Strategies of Local Tobacco Retail License (TRL) Policy Adoption in California

As part of the California Tobacco Control Program's (CTCP) goal of de-normalizing smoking and tobacco use, program strategies focus on population and community-level tactics to restrict and reduce tobacco use, with the adoption of local policy being a primary component (Roeseler and Burns, 2010). One policy promoted by local tobacco-control projects across California includes tobacco retail licenses (TRLs), which are ordinances that require all tobacco retailers within the jurisdiction to obtain a license to sell tobacco products. TRL policies generate funding which enables local law enforcement personnel to carry out vital enforcement and inspection operations. This funding is viewed as necessary given that the California state-level licensing process does not necessarily provide funds for direct enforcement of youth access tobacco laws, and the research overwhelmingly demonstrates the relationship between enacting and enforcing local tobacco youth access policies and their effect on the reduction of youth tobacco use (Cummings et al., 2003; Forster, et al., 1998; Jason et al., 1999; Siegel et al., 1999). Using a cross-case method, the objective of this study was to thus explore and evaluate the processes used by 28 state-funded local projects in their campaigns to adopt TRL policies in communities across the State of California. Particular attention was paid to the challenges faced by the local projects in their adoption campaigns of TRL policy, including the economic-related concerns of decision makers, and the many organizational barriers that arose and effectively thwarted the adoption of policy. In an effort to overcome these challenges, our research identifies five strategies used by successful local policy campaigns in securing TRL policy. 1) Learn local context and map an applicable approach/strategy 2) Identify and tap into a champion 3) Build relationships with local law enforcement agencies and decision makers 4) Gather local data 5) Educate community and present data to decision makers

Track 2: Engaging Diverse Communities/Achieving Health Equity with Tobacco Control Interventions

Tracy Delaney, Manager Chronic Disease And Health Disparities, County Of San Diego, Health and Human Services Agency
Irene Linayao-Putman, Program Manager, County of San Diego, Health and Human Services Agency

Opportunities for Local Tobacco Control Efforts in Chronic Disease Initiatives

This presentation will highlight key steps to creating a long term vision to improve health and describe the transformation of local public health agencies to make tobacco control an integral part of a comprehensive strategy to address chronic disease prevention. - Discuss the adoption of the 3-4-50 concept to address chronic disease that worldwide three risk factors/behaviors; tobacco use, poor nutrition, and lack of exercise-- contribute to four of the most prevalent chronic diseases and are responsible for over 50% of all deaths led to an upstream approach to maximizing limited staff resources. - Discuss the Place Matters approach to addressing the root causes of chronic diseases. - Outline how to establish a Chronic Disease Agenda to reduce chronic disease and health disparities. - Share how local health agencies can build capacity and mobilize the public health workforce to prevent chronic disease. - Demonstrate how to implement policy, systems and environmental change within local health departments and throughout the community through lessons learned from the Healthy Works, Communities Putting Prevention to Work (CPPW) program. - Discuss how to identify synergies with interdisciplinary partners, highlighting how health departments can interface with other agencies to ensure inclusion of public health impacts are addressed in critical planning processes. - Review the four major goals of the Live Well, San Diego!, Building Better Health, Initiative and discuss how local governments can engage and involve internal departments and community partners from across disciplines to achieve health in all policies. - Demonstrate how to administratively and politically approach making systems and policy change within your agency and throughout the community. - Share San Diego's strategic direction, challenges, lessons learned and next steps.

Julia Shrader-Lauinger, Youth Program Coordinator, California Youth Advocacy Network

A Statewide Review of the Best Strategies to Involve Youth in Tobacco Policy Campaigns

With over 3500 teens still trying their first cigarette each day, and 90% of current smokers attesting to beginning their addiction while still in their teen or young adult years, the recognition of youth perspective and participation is crucial to the success of tobacco prevention work. Youth and young adults are the primary targets of these efforts and they are often more receptive to efforts that engage them as priorities and key stakeholders, rather than simply bystanders without a voice. The California Youth Advocacy Network (CYAN)'s long term focus on these critical populations gives a unique perspective and a way to synthesize youth advocacy efforts from across the state. This poster presentation will be the culmination of a comprehensive project examining California youth involvement in all aspects of tobacco control efforts and serve as a tool to provide continued expertise on youth tobacco issues as well as to energize the field in the methods to incorporate the most effective strategies into the diverse aspects of their work.

Andrea Silva, Health Educator, The Santa Cruz County Health Services Agency
Natasha Kowalski, Sr. Health Educator, The Santa Cruz County Health Services Agency

Creating Momentum for Smoke-free Housing among Underserved Communities: Migrant and Seasonal Farm Workers in Santa Cruz County

The Santa Cruz County Tobacco Education Program is working with housing complexes that serve migrant and seasonal farm workers to adopt smoke-free policies. Given that migrant and seasonal farm workers often face difficult living and working conditions, staff initially questioned the importance of tobacco issues among this community. At the beginning of the project, a drive-by-shooting at one of the housing sites took priority over tobacco issues. Despite this challenge, staff learned how to make tobacco a relevant issue amongst several competing priorities. Though most of the participants were mostly unaware of the effects of secondhand smoke, they have become passionate, responsive, and motivated to address secondhand smoke. Though the project is in the early stages, staff has learned strategies for engaging farm workers and their families. The first lesson learned is the importance of identifying and working with the gatekeepers. Rather than collaborating directly with housing management, the best channel for reaching the residents is through the preschools that serve the children living in the housing complexes. The preschool staff (key gatekeepers in this community) is familiar with the needs of this community and is eager to work with tobacco education staff. They hold evening parent meetings covering a variety of relevant health topics that are very well attended. Due to demanding and fixed seasonal work schedules reaching housing staff by phone was challenging; instead, tobacco education staff visited the preschools and met face to face, in order to establish a relationship. Staff learned that tobacco is extremely relevant if a connection is made to the family's health. Most families were not aware of the effects of secondhand smoke on their children or that they could do anything about it. Once parents understood the danger to their children, the next step was to empower the families to be able to address secondhand smoke issues with both family members and authority figures. Parents engaged in lively and emotional discussions about how to ask a family member not to smoke around their children. Parents also built confidence by role-playing how to talk to authority figures. Now, parents not only care deeply about secondhand smoke, but they also realize they have the right to ask for change. The next step is to build on the parents enthusiasm and confidence to approach the housing management about policy change.

Lesly Valbrun, Health Educator Assistant II, Riverside County Public Health Tobacco Control Project
Consuela Edmond, Program Coordinator II, Riverside County Public Health Tobacco Control Project
James Jo, Health Educator, Riverside County Public Health Tobacco Control Project

Tobacco's War on Culture

The Tobacco's War on Culture presentations are an awareness tool addressing tobacco-related health disparity and the tobacco industry's targeting of ethnic/racial and minority communities. Tobacco use is the leading cause of preventable death in the U.S., which significantly influences inequities in health, social justice, and socioeconomic status. Interventions for ethnic/racial and minority populations are necessary to help achieve health equity among people. Tobacco related health inequities are

perpetuated by a lack of knowledge, action, and access to resources. The disproportionate prevalence and incidence of tobacco use among ethnic/racial and minority communities have led to Interventions specific to Hispanic/Latino, Black/ African-American, Native Americans, Asians, and the LGBT populations. The Tobacco's War on Culture presentations were developed to raise awareness, address tobacco related issues for each of the target groups, and to facilitate discussion on the topic. Tobacco industry tactics and methods such as experiential marketing, the 5S's (Sophistication, Slimness, Social Acceptability, Sexual Attractiveness, Status), cognitive susceptibility, media culture (social, internet, magazines, television, movies, and etc.), sponsored events, and more are also addressed. Furthermore, educating each group about the dangers of second and third-hand smoke, mentholated tobacco, chemicals in tobacco, and morbidity and mortality rates have helped to increase awareness. A general presentation addressing each of these components was also developed for youth groups and community members. Tailoring the Tobacco's War on Culture presentations for each ethnic/racial and minority group may increase the efficacy of tobacco control prevention efforts and reduce health inequity.

Track 3: Demonstrating Program Performance and Effectiveness

Dawn Dunn, Project Director, Santa Barbara County Public Health Department
Trina Long, Health Educator, Santa Barbara County Public Health Department

Tools of the Trade: Reinventing Evaluation at the Local Level

The tobacco control movement in California has been waged on many fronts. The state has based their game plan on sound public health education and policy research; recommending a comprehensive approach aimed at changing social norms. One of the primary interventions employed at the community level has been mobilizing and advocating for strong local policy adoption. Many activities have proven to be effective in these efforts, but the use of data and evaluation tools has often been overlooked as a tool to advance the policy debate. Almost a decade ago, the California Public Health Department's Tobacco Control Program began stressing the need for sound, evidence-based evaluation strategies to measure the success of its funded local programs. This emphasis has grown in scope and correspondingly placed an increasing burden on funded projects, whose resources are dwindling. Though the evaluation efforts are widely supported at the community level, many project directors and their supervisors are seeking improved ways to collect and share the necessary data. This poster presentation will showcase four evaluation methods that have been used to gather findings on various aspects of local policy campaigns. These have demonstrated efficacy in reducing work load, while still yielding usable information. These tools range from a public hearing report form to a Global Information Systems map that depicts the relationship between tobacco retail outlets, schools and illegal sales of tobacco to underage youth. The poster will detail the purpose and use of each instrument, along with their strengths and limitations. An emphasis will placed on the how these tools provide sufficient qualitative data, allow for coalition member inclusion in process evaluation, reduce time, and even enhance the usefulness of the findings. There is no doubt that standard research methods have a role in the field of tobacco control. However, the realities of work at the local level make some of these techniques untenable. Therefore, any innovative approaches to data collection and reporting should be

shared widely and accepted, even if with skepticism, by researchers. The meaningful marriage of the traditional and the practical will result in improved evaluation of less critical interventions, while potentially engendering willingness and time for more aggressive evaluation of core interventions at the local level.

Elisa Tong, Assistant Professor, University Of California, Davis
Tami MacAller, Senior Health Promotion Specialist, California Diabetes Program

Increasing Quitting among Medi-Cal Smokers: The Medi-Cal Incentives for Prevention of Chronic Disease Project

California is one of 10 states that received a grant award under Medicaid Incentives for Prevention of Chronic Disease (MIPCD), a new program established by the Affordable Care Act and administered by the Centers for Medicare & Medicaid Services (CMS). Each award is for 5 years and will test the effectiveness of providing incentives directly to Medicaid beneficiaries who participate in MIPCD prevention programs, and change their health risks and outcomes by adopting healthy behaviors. The goals of the California MIPCD Project are to increase tobacco cessation among Medi-Cal beneficiaries who currently smoke, and to improve the management of diabetes and other chronic disease by means of tobacco cessation. For the primary intervention in California, Medi-Cal members will be offered a $20 incentive to call the California Smokers' Helpline, complete the intake protocol, and participate in counseling sessions. Beneficiaries may also be able to obtain nicotine replacement therapy by calling the Helpline. To encourage callers to maintain their efforts to quit smoking, eligible beneficiaries may also receive $10 for every relapse-prevention call they complete. Participation over the project period is expected to reach as many as 100,000 Medi-Cal beneficiaries and double the number of calls to the Helpline from Medi-Cal beneficiaries who currently smoke. The primary outreach effort will be guided and implemented by the California Diabetes Program and will launch in 2012. The California MIPCD Project is expected to demonstrate that tobacco cessation benefits, including both pharmacological and behavioral treatments, that are well-promoted and barrier-free and include modest incentives for utilization and retention, are effective in reducing smoking prevalence, lowering Medi-Cal health care costs, and improve health outcomes for diabetes management in particular. Both the Helpline and the California Diabetes Program plan to conduct rigorous evaluations which will allow them to tailor their interventions throughout the grant period. Collaborators at the University of California, San Francisco also will perform economic analyses of the incentives program to determine cost effectiveness. The California Department of Health Care Services will oversee the program; partner organizations include the California Medicaid Research Institute, a University of California multi-campus research program; the California Smokers' Helpline, the California Diabetes Program, and the University of California, San Francisco.

Program Abstracts

Workshops Presented on April 12, 2012

Track 1: Tobacco Control Policy Advocacy and/or Media Strategies

Ofelia Alvarado, Policy Director, American Lung Association in Ca/San Diego
Neil Klepeis, Ph.D

A Picture is Worth a Thousand Words: Using Air Monitors to Support Smokefree MUH Policies

Residents in multiunit housing (MUH) face many roadblocks in alleviating drifting secondhand smoke (SHS). Advocates are not able to fully convey to decision makers the day to day living conditions within a home impacted by SHS. The distress and psychological trauma suffered by these residents violates the sheer sanctity of home. Yet, the onus to mitigate the problem falls solely on the shoulders of those whose cries for help go unheeded. One reason why complaints to decision makers fail to spur a solution is because the problem can only be related subjectively by residents enduring the onslaught of SHS. At best, this subjectivity can be supported by science, personal doctor notes, and industry articles. Yet, to objectively express what the impact looks and feels likes by these residents is not within their means to present. To walk in their shoes, means to have experienced the pain and suffering as they have. However, an objective measurable alternative is available. Fine particle mass concentrations can be measured in MUH where SHS is reported. In collaboration with Dr. Neil Klepeis, a nationally-recognized expert on measuring air quality in home environments, the American Lung Association in California/San Diego purchased customized real-time particle counters (Dylos, Inc.). These air monitors were placed where SHS was reported in MUH. The instruments were left in homes from 3 days to 2 weeks, during which readings were logged approximately every 10 to 20 seconds. The instrument readings are not specific to SHS, so residents were asked to fill out a diary of activities to discern when the readings were produce by SHS. Preliminary results from several residences reveal sizeable levels of particles inside the home during the time residents logged the odor of SHS. The data was plotted on a graph revealing an observable spike when SHS was detected. The change in ambient air was so visually profound, that presenting the graphs to a City Attorney prompted the immediate drafting of a MUH no smoking ordinance. A condo owner used her graph to make a case for a no smoking policy with her HOA. A tenant, having won a temporary restraining order, is using hers to corroborate her claim to the judge that the neighbor continues to smoke and is in contempt of court. Armed with these plotted graphs, residents are now equipped with a visual interpretation of their complaints when there is no other recourse.

Kimberly Bankston-Lee, Senior Program Director, Breathe California of Sacramento-The Stand Projects

STAND's Approach to Smoke-free Multi-family Housing--The 3 R?s: Relationships, Return on Investment and Resources

Due to the health risks associated with secondhand smoke, the demand for smoke-free rental housing is growing. Recent Sacramento surveys indicate renters prefer smoke-free units. STAND conducted two

surveys: 1) apartment households and 2) industry members. From the apartment households survey, STAND found that 81% of respondents do not allow smoking in their own unit, that 50% were exposed to drifting secondhand smoke while in their unit and 72% prefer to live in a complex that offers smoke-free units. From the multifamily housing industry survey, 66% reported having some kind of smoke-free policy in their rental communities, which ranged from complete smoke-free policies (24%), to designated smoking areas outside of buildings or other areas on property (22%) or smoke-free units (11%). In addition, 51% of respondents are interested in developing or adding smoke-free policies to their complexes. In response to this trend, STAND partnered with the Rental Housing Association of Sacramento Valley in 2005, an affiliate of the California Apartment Association, to advocate for social norm change in the multifamily housing industry in regards to smoke-free housing. RHA has a membership of over 1,000 property owners and managers representing 80,000 units. STAND and RHA have seen much success with smoke-free voluntary policy adoption through building relationships with property owners, managers and management firms, demonstrating a return on investment as a result of policy adoption and developing tools for the industry, making the process easier. As a result, 193 properties are listed on the new smokefreerental.com website, of which 83 are from Sacramento and the other 110 from other areas in the state. Challenges, Barriers and lessons learned: Half way through the 2008-2010 grant cycle, one of the biggest challenges was the economy and the impact it had on managers interest in filling units, on in-kind services from partners, and on internal staff changes due to elimination of program funding. This caused redirecting of staff and a delay in intervention activities and also required time to form new relationships. However, since 2009, the economy has improved in the rental industry as more homeowners have become renters, partners leveraged other programs, and relationships have become even stronger as a result of working together on educational materials, the website, presentations and training materials.

Janie Burkhart, Project Director, Santa Clara County Public Health Department Tobacco Prevention & Education Program
Nicole Coxe, Policy Lead, Santa Clara County Public Health Department Tobacco Prevention & Education Program

Utilizing a Tobacco Report Card Tool to Influence Policy Change and Create Healthier Communities in Santa Clara County

Santa Clara County is the 5th largest county in California with a diverse population of nearly 1.8 million residents in 15 cities and unincorporated areas. Santa Clara County residents with very low income smoke at twice the rate of people with above-median income and those same communities face a higher incidence of environmental pro-tobacco influences through tobacco advertising and sales. The 2007-2010 Tobacco Report Card Project was developed based on the Communities of Excellence assessment, with the goal to counter pro-tobacco influences and reduce availability of tobacco products to youth in the entire community through policy change. Outcome data collection included store observational surveys, law enforcement surveys, municipal code and policy record review surveys. Cities were graded on a 100-point scale in four key areas: level of compliance with current advertising requirements, strength of tobacco control policies, level of enforcement of tobacco sales to minors' laws, and community education efforts. Each city's final grade was publicized in a media release two

times over the three-year project period. 11 of the 13 targeted intervention cities improved their grade by at least one grade level over the first year baseline. Cities improved their grade by: adopting new policies that require annual licensing of retailers; restrict tobacco sales near schools; increasing enforcement of tobacco sales to minor's laws by 61.5%; improving compliance of window coverage restrictions by 6.0% and required signage posting by 9.7%; and becoming 100% compliant with self-service display ban. Utilizing the media to publicize the Tobacco Report Card results was crucial in getting cities to take immediate action to improve their grade performance, to create healthier communities. Lessons learned include: Engaging cities early and educating officials about the Report Card criteria was beneficial in garnering their support of the project and getting cities to take action to elevate their grade before the final results were published. Utilizing the media to publicize the results was crucial in getting cities to take action to improve their grade performances, partially due to the nature of friendly competition. Providing resources, such as trained youth volunteers, city-specific data, training and technical assistance to cities was critical, especially as budget reductions have prevented cities from prioritizing tobacco prevention efforts.

Gonzalo Coronado, Chronic Disease Prevention Coordinator, County of Monterey
Rose Colon, Health Program Coordinator, County of Monterey

Identifying and Overcoming Internal Barriers to Policy Work

The Monterey County Health Department had an unofficial internal policy which prohibited county employees from engaging in policy work. This was in direct conflict with many Health Department program objectives and grant requirements. A previous LLA Coordinator was preparing to send a letter to the Board of Supervisors regarding the Master Settlement Agreement. When threatened during her probationary period to cease her actions or face termination she, ultimately, chose to quit. As the current LLA Coordinator I have also received a similar message. The veil of opposition was clear and led to an unhealthy work environment resulting in minimal progress in meeting grant objectives. My colleagues and I are mandated by our grants to work in the policy realm and working under this toxic cloud of uncertainty was very difficult and ineffective. It appeared that policy work would never be initiated nor supported by this department. However, there was a significant change. A new Board of Supervisors (BOS) was elected who hosted public meetings to review upcoming BOS agenda items. I attended one such meeting where the County Chief Administrative Officer was present. I mentioned at this meeting the difficulty in pursuing policy objectives when the unofficial policy prohibited policy work. I also had an opportunity to explain the experiences of the previous tobacco control coordinator in private to the BOS. During this time a Coalitions and Collaborative workgroup made up of colleagues who work in the policy arena was formed. The interim Director of Health asked to attend the meeting to clarify what the Health Department's role was in regards to public policy. The information relayed at this meeting was that in no uncertain terms the role of Health Department (and employees) is to pursue public policies that promote public health. The shift was apparent and the veil of threat was lifted immediately. My colleagues and I felt substantiated. To conclude, the Monterey County Health Department and employees are working on key policy issues to include developing and amending county ordinances such as TRL and Social Hosting. Employees feel supported and engaged in policy discussion. Lessons learned: Find out what your Board of Supervisors will support Find a Supervisor

who can champion the cause/policy for change Be courteous and professional; know when to talk privately and publicly Establish a platform among colleagues where you can have discussions about the barriers and opportunities of staffing coalitions and collaborative.

Denice Dennis, Project Director, Contra Costa Tobacco Prevention Project
Jaime Jenett, Policy Coordinator, Contra Costa Tobacco Prevention Project

Implementation of a Comprehensive Secondhand Smoke Protections Policy-- Lessons from the First 5 Years

The Contra Costa Board Of Supervisors first adopted a comprehensive secondhand smoke protections policy in 2006, which included prohibiting smoking in all buildings open to the public; within 20 feet of doorways and windows of buildings open to the public and of multi-unit housing residences; outdoor dining; outdoor service areas; parks and trails; outdoor special events; indoor and outdoor common areas of multi-unit housing; and the campuses of the County hospital and clinics. The policy was later strengthened on two separate occasions to 1) clearly articulate manager/owner responsibilities; and 2) provide for additional multi-unit housing protections, including landlord disclosure; prohibiting smoking on balconies, decks, patios and in carports; and prohibiting smoking in 100% of all new multi-unit housing residences. While implementation has relied heavily on education, signage, and responding to consumer complaints, each provision of the policy has required some unique strategies. Implementation has required the Tobacco Prevention Project to partner with other departments within the County and outside agencies that have had a varied level of commitment to bringing about enhanced compliance with the law. These partners have included the Business License Office, the Building Permit Center, Environmental Health, and Public Works. Outside agencies have included the local chapter of the CA Apartment Association, the County Housing Authority, and several transit companies. Additionally, the County's implementation efforts have been a model for four other cities that adopted comprehensive protections, however three cities have viewed implementation and the resources needed for such as an impediment to adopting secondhand smoke protections. Cities that are not in the readiness stage for implementation efforts have required revised strategies for adoption and implementation planning efforts. There is some evidence that cities that conduct implementation planning prior to adoption of the policy have succeeded faster in implementation of signage requirements. Successes and challenges to full implementation of the County's policy will be discussed, as well as potential implementation issues that may be presented by cities.

Dawn Dunn, Project Director, Santa Barbara County Public Health Department
Melissa Peters, Health Education Specialist, County of San Luis Obispo Public Health Department

Breathing Life into Comprehensive Secondhand Smoke Ordinances

California communities have been expanding the horizon of outdoor secondhand smoke policies for more than a decade. To date, over 40 communities have adopted comprehensive secondhand smoke ordinances that address at least four of seven outdoor areas identified by The American Lung Association's Center for Tobacco Policy and Organizing. These policies once considered progressive and out of reach for many local programs are proliferating. The anatomy of successful policy adoption has

been well documented and these methods have been replicated in the field. Effective policy implementation has received far less attention. This presentation will explore successful and challenging aspects of the real world application of model ordinances. Post-policy adoption experiences from two central coast communities will be detailed and data gathered from early adopters will also be highlighted. The City of San Luis Obispo (2010) and City of Carpinteria (2011) both adopted ordinances that restrict smoking/tobacco use in virtually all public places, with few exceptions. From their experience several key strategies can lead to successful implementation. 1. Expect post-policy effort to be significant initially, and monitoring to be ongoing 2. Develop realistic goals about compliance and quantify outcomes 3. Apply common sense to enforcement approaches 4. Use education and multi-media tactics; be strategic, using clear and tested messages 5. Effective signage is crucial 6. Continued community mobilization is beneficial. Several universal challenges have emerged. One of these is the need to manage the delicate balance between reliance on the city staff and enforcement officials, and their need for control and independence. The inclusion of common areas in multi-unit housing is shared by many of these policies and was thought to be a baby step into this emerging tobacco control arena. It has proven to be the most time consuming component of implementation. Reliance on a solely complaint driven enforcement strategy has proven to be shortsighted. These and other implementation tactics will be explored, using graphic examples of local errors and triumphs. Some of the issues encountered in the field do not have simple solutions and tobacco control advocates have not reached consensus on all of them either. However, these comprehensive ordinances are achievable and despite the fact that policy strength varies along with community readiness, and 100% compliance is rarely achieved, these policies advance the tobacco control cause, as long as sustained and genuine implementation efforts ensue.

Justin Garrett, Policy Manager, American Lung Association In California

Successful Tobacco Control Policy Work in Rural California

Advocates working on tobacco control ordinances in rural California face unique challenges in their communities. The same strategies and resources that work well in Los Angeles and San Francisco do not translate to Alturas and Hughson. Yet, despite these challenges, many rural communities in California have successfully adopted strong tobacco control policies. This session will highlight those successes and feature speakers that have worked in rural communities to talk about their policy efforts. At this session, the Center for Tobacco Policy & Organizing (the Center) will release and discuss a new resource that documents the rural policy success in California. Using data from the Center's resources on local tobacco control policies, the Center's statewide survey of rural voters and the American Lung Association in California's State of Tobacco Control: California Local Grades report, the session will provide an overview of rural policies around the state. Tobacco control policies have been adopted in rural counties throughout California, from tobacco retailer licensing ordinances in Kern County to a smokefree housing authority policy in Plumas County to smokefree outdoor air ordinances in dozens of cities. The Center has also conducted organizing trainings in rural counties throughout the state on a variety of policy issues. The session will features observations and lessons learned from those trainings about strategies for working on policy in rural communities and which policy areas have seen the most progress. Finally, tobacco control advocates from rural communities will share the story of their successful policy efforts.

They will talk about how they overcame specific challenges that have appeared in rural communities and why some types of policies are easier to pass in rural communities than others.

Marlene Gomez, Associate Director, S.A.F.E. Smokefree Air For Everyone
Esther Schiller, Director, S.A.F.E. Smokefree Air For Everyone

Passing a Smokefree Housing Ordinance in a Low SES Community (Baldwin Park)

A member of the Baldwin Park City Council was interested in championing smokefree housing. Surveys of apartment and condominium residents were conducted in the community at Laundromats and door to door in affordable and market rate housing. Results showed that 1 in 3 families were being exposed to a neighbor's tobacco smoke. 85.5% of respondents favored a law requiring some units in a building to be non-smoking. This included 65% of current tobacco users. SAFE planned to create a coalition in the community. Unfortunately, another agency (HEAC) working on obesity had already established themselves. They requested that any coalition building in the community be done in collaboration with them. This did not work due to the different priorities of the two projects. We were fortunate that the same staff person assigned to HEAC had written all the other tobacco control policies in the city and became available to SAFE Tobacco control policies in the city included smokefree parks, smokefree outdoor dining and Tobacco Retail License. As part of our effort, we met with 3 out of the five councilmembers including our champion. SAFE collaborated with the city and developed a survey for landlords which the city sent to all landlords. SAFE analyzed the survey and then collaborated with city staff in presenting to a meeting of landlords. But an additional barrier became apparent in the second year of the project. The concept of a housing ordinance was agendized four different times during that second year. Each time SAFE mobilized supporters who had been discovered during surveys. Each time the item was removed from the agenda with very little notice. The staff person who had been working with us said he was too busy and suggested that another staff person take the project. Then that staff person became ill and took a leave of absence. It was clear that there was a problem in the city, but we were not aware of what it was. Attempts to reach our champion were unsuccessful. (As it turned out, she was ill.) SAFE asked for a meeting with the city's City Manager. To our surprise, he met with us and was discovered to be the real barrier in the process. It took another year of educating the city manager, and working with TALC to develop an ordinance acceptable to the city manager for a comprehensive ordinance to be passed.

Robin Kipke, Evaluation Associate, Tobacco Control Evaluation Center

Sentiment, Influence and Engagement: Ways to Evaluate the Effectiveness of your Social Media Presence

The number of social media formats, tools and analytic applications keeps increasing. To employ social media effectively to support their advocacy efforts, organizations need to understand: The various types of social media available and how to use them; The advantages and disadvantages of each; What insights analytical data can reveal; How programs can use data to improve their efforts Social media is transforming the way people obtain and share information, yet most tobacco control projects in California are just beginning their exploration of these tools to broadcast health messages, build and

rejuvenate coalitions, and recruit volunteers. In a 2011 statewide needs assessment, less than 4 percent of respondents felt very experienced using social media, and 71 percent would like to receive training. To help projects understand how to capitalize on the reach and cost-benefit social media can provide, the California Youth Advocacy Network (CYAN), the Tobacco Control Evaluation Center (TCEC), the Shasta County Tobacco Education Program and San Diego State University (SDSU) have joined forces. Sharing practical examples of how projects can use social media to their advantage, this proposed four-session panel would cover: 1. The social side of tobacco control: How emerging technologies can be useful for advocacy efforts; a brief overview of social media platforms and how they can be used to promote tobacco control campaigns and messages by Amelia Silbert-Geiger of CYAN. 2. Next, Nathan Read from the Shasta County Tobacco Control Program will talk about Putting out the fires: How a county health department is using Facebook to promote policy and anti-tobacco messages. 3. In session 3, Robin Kipke from TCEC will cover Sentiment, Influence and Engagement: Ways to evaluate the effectiveness of your social media presence. 4. Wrapping things up with a practical slant, Joe Smyser from SDSU will illustrate Leveraging social media to advance your efforts: A case study of SDSU's "Toxic Butts" campaign to promote the Tobacco Waste Reduction Toolkit. In this economic climate, advocacy organizations must achieve more with fewer resources. Social media is one avenue for doing this. To determine whether using Facebook, Twitter or other media is having the desired effect, projects need to know how to assess their social media reach. Robin Kipke will demonstrate how to use existing metrics to determine the value of a social media campaign.

Monty Messex, Deputy Director, Los Angeles County Tobacco Control & Prevention Program
Mark Weber, Ph.D., Los Angeles County Tobacco Control & Prevention Program
Jack Nicholl, M.A., The Center for Tobacco Policy and Organizing

After Passing the Policy - What's Next? Steps to Ensure that Adopted Policies are Implemented and Enforced

A primary avenue for changing social norms about tobacco use is through enactment of strong local tobacco control policies (e.g., smoke-free parks). However, if the enacted policy is not implemented and enforced it stands little chance of achieving its desired outcome. Since 2004, 105 local tobacco control policies have been adopted by cities in Los Angeles County. Unfortunately, we have seen that policy implementation and enforcement is not necessarily assured once a policy has been enacted. The Los Angeles County Department of Public Health (LAC/DPH) in partnership with the American Lung Association in California's Center for Tobacco Policy and Organizing developed a set of post-policy adoption activities specifically designed to address this problem, including: 1) Researching how the policy should be implemented and enforced to be effective; 2) Renewing relationships with elected officials and staff developed during the advocacy campaign and developing new relationships with staff involved in implementing the policy; 3) Enlisting the public as an ally in the implementation and enforcement effort by increasing public awareness; and 4) Evaluating the effectiveness of the implementation and enforcement effort. Post-policy adoption activities have been implemented since 2007 by LAC/DPH staff and community partners in a variety of tobacco control policy areas, including: smoke-free outdoor areas, smoke-free multi-unit housing and tobacco retailer licensing. Field-based experiences to date suggests that these activities are effective tools for nongovernmental organizations,

community advocates and health departments to employ to help ensure that enacted tobacco control policies are implemented and enforced as intended.

Joe Smyser, San Diego State University

A More Social Tobacco Control: Using Social Media to Power Your Campaigns!

The number of social media formats, tools and analytic applications keeps increasing. To employ social media effectively to support their advocacy efforts, organizations need to understand: The various types of social media available and how to use them; The advantages and disadvantages of each; What insights analytical data can reveal; How programs can use data to improve their efforts Social media is transforming the way people obtain and share information, yet most tobacco control projects in California are just beginning their exploration of these tools to broadcast health messages, build and rejuvenate coalitions, and recruit volunteers. In a 2011 statewide needs assessment, less than 4 percent of respondents felt very experienced using social media, and 71 percent would like to receive training. To help projects understand how to capitalize on the reach and cost-benefit social media can provide, the California Youth Advocacy Network (CYAN), the Tobacco Control Evaluation Center (TCEC), the Shasta County Tobacco Education Program and San Diego State University (SDSU) have joined forces. Sharing practical examples of how projects can use social media to their advantage, this proposed four-session panel would cover: 1. The social side of tobacco control: How emerging technologies can be useful for advocacy efforts a brief overview of social media platforms and how they can be used to promote tobacco control campaigns and messages by Amelia Silbert-Geiger of CYAN. 2. Next, Nathan Read from the Shasta County Tobacco Education Program will talk about Putting out the fires: How a county health department is using Facebook to promote policy and anti-tobacco messages. 3. In session 3, Robin Kipke will cover Sentiment, Influence and Engagement: Ways to evaluate the effectiveness of your social media presence. 4. Wrapping things up with a practical slant, Joe Smyser from SDSU will illustrate Leveraging social media to advance your efforts: A case study of SDSU's "Toxic Butts" campaign to promote the Tobacco Waste Reduction Toolkit. Joe Smyser will detail how, operating under a tight budget, the Tobacco Waste Reduction Toolkit team formed a coalition of marketing, design, communications, advocacy and public health professionals to create a targeted, branded awareness campaign across social media platforms. This session will provide a detailed account of the design, management, monitoring and evaluation of the statewide six-month "Toxic Butts" campaign. This panel series will be useful to any organization seeking to capitalize on social media for their advocacy efforts.

Mary Williamson, Project Director, Tobacco Control Program, Mendocino County Health and Human Services Agency
Tina Tyler-O'Shea, Program Coordinator, ACHIEVE (Action Communities for Health, Innovation and Environmental Change) Mendocino County Health and Human Services Agency
Dan Gjerde, City Council Member, City of Fort Bragg

Integrating Tobacco Policy into Community Change Strategy

Mendocino County (population 90,000), a rural coastal county, has a predominately white/non-Hispanic population, with large communities of American Indians (6%) and Latinos (20%). In 2007, the California

Health Interview Survey found that 25% of Mendocino County adults and teens were current smokers, nearly twice the statewide rate of 13%, and up to 80% of American Indians were current smokers. As is common all over California, Mendocino County's funding for public health programs has been slashed over the past couple of years. Synergy among government and community partners is critical for sustaining and adapting these programs and policy change strategies must underlie these health efforts. In 2010, Mendocino County was chosen to participate in the CDC's Healthy Communities Program, which has a history of investing in communities health and quality of life by supporting policy, systems and environmental change strategies. The Mendocino County Tobacco Control Program (TCP) joined together with local government and community-based agencies to create Mendocino County's ACHIEVE (Action Communities for Health, Innovation and Environmental Change) coalition. The first task carried out by the ACHIEVE coalition was an extensive community assessment. The Mendocino County TCP played a leadership role in assessing tobacco policy and environment in each of the five sectors of ACHIEVE's community assessment tool: Community-at-Large, Community Institution/Organization, Health Care, School, and Work Site. As a result of the assessment and ACHIEVE?s ongoing efforts, tobacco policy has been integrated into a number of community-based health promotion goals and the Mendocino County TCP has been able to integrate its Proposition 99-funded objectives into these efforts, multiplying their effectiveness while supporting the policy and environmental change efforts of other ACHIEVE partners. These ongoing initiatives include: Integrating Tobacco Retailer Licensing with other policy initiatives to enhance community health in the City of Fort Bragg, providing technical assistance and bilingual materials. Using the development of a Smoke-free Workplace Policy to support an incentive-based program to reduce health insurance costs for Mendocino County staff. Supporting the implementation of a Smoke-free Workplace Policy at Northern Circle Indian Housing Authority, providing education, participating in Tribal Health Fairs and Workshops and supporting outreach to tribal housing. The Tobacco Control Program's leadership in the ACHIEVE coalition creates synergy to promote healthy environments in Mendocino County that is greater than the sum of its parts, benefiting all county residents.

Statice Wilmore, Coordinator, Tobacco Control Program
Lydia Acosta, Community Service Rep II, Tobacco Control Program

Cancer Clouds: Effective Policies to Reduce Drifting Tobacco Smoke in the Home

Although Californians have extensive protections from exposure to secondhand tobacco smoke where they work, eat and play, many are still exposed to secondhand smoke where they live. Studies have shown that tobacco smoke can travel through a building, via air conditioning units, vents, balconies and patios, affecting other residents. Residents report they are suffering from cancer clouds lingering and/or drifting into their homes and many have experienced health problems, poorer quality of life, and reduced overall habitability of their residences. The Pasadena experience will demonstrate how to develop, implement, and enforce effective Multi-unit Housing (MUH) policies that reduce secondhand smoke exposure in places where people live. These MUH policies included input from 14 impacted relevant MUH housing entities and reflects a comprehensive approach to address this very complex public health issue.

Track 2: Engaging Diverse Communities/Achieving Health Equity with Tobacco Control Interventions

Narinder Dhaliwal, Project Director, California's Clean Air Project
Lourdes Baezconde-Garbanati, Project Director TEAM Lab - USC
Roland Moore, Senior Research Scientist, Pacific Institute for Research and Evaluation

Smoke-free Tribal Casinos - A Real Possibility: Different Approaches to Achieve Success

While the Smoke-Free Workplace Act (SFWA) protects workers throughout California, one section of employees is left vulnerable to exposure from secondhand smoke (SHS) casino employees. This session will detail different tobacco control and research/evaluation approaches to effectively address SHS protection for casino employees. California's Clean Air Project (CCAP)'s goal is to promote smoke-free work places for workers in sovereign tribal casinos and smoke-free gaming for the public. CCAP's collaborative approach focuses on working with tribal leaders and casino managers to move towards adopting and implementing voluntary policies comparable to the SFWA. USC's TeamLab approach has more of a direct labor focus due to a large number of casino workers in southern California being of Hispanic/Latino origin. TeamLab has made strides in identifying unique ways to work with the Hispanic workers in tribal casinos. University of Southern California (USC) Process data evaluation and research activities have been conducted to document the problem, collect SHS exposure data identify strategies, provide information regarding intervention activities and documenting the process. Many lessons have been learned including: 1. Adopting strong smoke-free workplace policies in tribal environments is a long-term process, which can only be achieved by a top down process of intervention rather than grass roots. 2. A strong and active advisory committee including representation from tribal entities is critical in engaging the casino management and tribal councils and building support to reduce exposure to SHS in tribal casinos. 3. Identifying key individuals within the Hispanic/ Latino population and building a relationship to gain access to these workers in tribal casinos is needed. 4. Providing technical assistance to the tribal entity with strict confidentiality is essential to bringing the importance of a smoke-free workplace to the forefront of the tribal council and casino management decision makers. Recommendations from CCAP and USC work to continue building on the successes and learn from the challenges and barriers encountered will be presented. The presentation will include a discussion of challenges encountered when conducting ethnographic research to study CCAP's process for change - this work is being done by a partnership between to Pacific Institute for Research and Evaluation and ETR Associates. The session will conclude with remarks and observation from Dr. Patricia Nez-Henderson who has been working with the Dine' (Navajo) tribe and Gary Hayward Win River Casino manager and Redding Rancheria tribal council member.

Linette Escobar, Director, BACR Tobacco Education Programs, Sunset Russian Tobacco Education Project
Tiffany Chin, Project Director, Project RIDE

Asian Boys Who are into Cars and Russian Speakers, How's that for Specific Lessons Learned at Bay Area Community Resources

Bay Area Community Resources has been a CTCP partner since the passage of prop 99. From a regional tobacco project to work with young adults, we have responded to the needs of our changing communities. Two of our longest running projects, Project RIDE and the SUNSET Russian Tobacco Education Project have 12 years experience working with unique peripheral cultures within the broader category of priority populations. Come learn our best practices in serving very unique populations with higher than average smoking rates and exposure to secondhand smoke. These include defining the population, gaining access into closed communities, defining cultural norms as opposed to stereotypes, using culturally appropriate outreach activities, framing the issue and creating our own meaningful media material.

Colleen Haydon, Military Program Manager, California Youth Advocacy Network (CYAN)
Beth Olagues, College Cessation Consultant, California Youth Advocacy Network (CYAN)

Exploring Cessation Services for Young Adults

In 2010, the California Youth Advocacy Network (CYAN) assessed cessation services available at over 100 public colleges and universities and 20 military installations. The purpose of the assessment was to better understand existing services and identify ways of strengthening tobacco cessation programs available to young adult tobacco users. This session will present the findings of the statewide young adult cessation assessment and offer recommendations for ways local tobacco control programs can support college health centers and military installations in promoting cessation services available on campus, on base, and in the local community. Additionally, this presentation will discuss the tobacco use behavior of young adults in college and the military, including student veterans. Participants will gain a better understanding of why young adults use tobacco and what motivations they have for quitting. Information will also be presented on what cessation methods (e.g., group class, cold turkey) young adults are most likely to use and how tobacco control and public health professionals can support them in quitting. Session participants will benefit from the relevant programmatic experience as well as the distinctive and transferable perspective the presenters' showcase. A lively and interactive discussion will take place to help participants apply the presenters' experiences to their current or future work with military community, college campuses, and student veterans.

Kim Homer Vagadori, Project Director, California Youth Advocacy Network (CYAN)
Julia Shrader-Lauinger, Youth Program Coordinator, CYAN
Colleen Haydon, Military Program Manager, CYAN

Engaging Youth and Young Adults in Tobacco Control Programs

Youth and young adults play an important role in tobacco control efforts. The Centers for Disease Control and Prevention (CDC) recently published guidelines for engaging youth in tobacco-free policy advocacy activities. The Best Practices User Guide: Youth Engagement was written to provide tobacco control professionals with information on the best practices for engaging young people as part of a comprehensive program. The California Youth Advocacy Network (CYAN) recognizes the overwhelming power of youth and young adults in social movements, specifically in tobacco control. Using the CDC model, CYAN works with local programs to engage young people in tobacco-free policy and education initiatives. CYAN's efforts focus on community and coalition building to increase the knowledge of tobacco control issues while developing a solid understanding of youth and young adult culture. In this session, participants will be introduced to the unique culture of California youth, college students, and young adult service members as well as their tobacco use behavior. Participants will also learn how to reach youth and young adults and engage them in local tobacco-free efforts using four key strategies -- policy advocacy, media advocacy, community engagement, and activities to fight pro-tobacco influences. Furthermore, information will be shared on how local policy change impacts California's young people.

Jaime Jenett, Policy Coordinator, Contra Costa Tobacco Prevention Project
Denice Dennis, Project Director, Contra Costa Tobacco Prevention Project

A Pilot Project to Engage Diverse Communities in Tobacco Prevention in Contra Costa County

In an effort to increase the participation of organization's serving the county's diverse populations, a formal organizational cultural competency assessment was conducted with Contra Costa Tobacco Prevention Coalition in March 2009. The assessment focused on organizational policies and practices of the Coalition that may impact the involvement of these agencies in local tobacco prevention work. Development of the assessment tool involved identification of best practices in assessing organizational cultural competency and formative interviews with key community-based agencies. The assessment results led the Coalition to work with key people at selected agencies to develop a framework to improve collaboration and participation and to revise Coalition Operating Guidelines to support participation from diverse communities in the Coalition's work. Focused interviews with key organizational leaders yielded recommendations designed to increase the involvement of these agencies in both long-term and short term planning and advocacy/implementation activities. The Tobacco Prevention Coalition Guidelines were revised to include these recommendations to increase the involvement of diverse communities. Agencies serving diverse populations in communities where the Coalition has prioritized work were identified as potential partners. Presentations to these agencies included detailed information about the impact of tobacco on the populations served and a menu of tobacco prevention advocacy activities as an alternative to attending meetings or becoming an official

member of the Tobacco Prevention Coalition. The presentations also exemplified Resolutions calling for the Food and Drug Administration to ban menthol flavoring in tobacco products and discussion of the disproportionate use of mentholated tobacco products in targeted communities as a starting point for discussing local tobacco control policies. Communication systems were established to share trainings, research articles, and other information related to tobacco and the communities they serve. At the time of submission of this abstract, the success of this intervention in engaging additional agencies in local tobacco prevention activities has not been fully evaluated. The activities we have begun as considered part of a long-term commitment to these organizations. To date, none of the organizations have attended a regular Coalition meeting, however four organizations have participated in one advocacy activity each. Activities include providing testimony in support of Resolutions calling for the Food and Drug Administration to ban menthol flavoring in tobacco products in the cities of San Pablo and Richmond and meeting with a policy maker and providing testimony on secondhand smoke protections in the city of Concord.

Twlia Laster, Project Manager, The SOL Project
Kimberly Bankston-Lee, Project Director, The SOL Project

The SOL Project: African Americans for Smoke-Free Outdoor Dining!

In 2007, The SOL Project, Saving Our Legacy: African Americans for Smoke free Safe Places identified the African American/African Immigrant (AA/AI) community as a population requiring education and awareness in reducing exposure to secondhand smoke and smoking prevalence. California Health Interview Survey (CHIS, 2007) data indicated that AA/AI in Sacramento and San Joaquin counties had a higher smoking prevalence rate (29.9%) than did other race/ethnicities (between 10-15%). Furthermore, many restaurants and bars either owned or frequented by AA/AI in both counties were not smoke free in outdoor dining areas. SOL Project staff identified over 80 establishments to target for voluntary smoke-free outdoor dining policies. Public opinion polls collected during the project showed that 90% of AA/AI in the Sacramento Valley supported some kind of smoke-free outdoor dining policy. Almost three-quarters (74%) believed smoking was a major issue, and 61% were more likely to go to a restaurant with an outdoor dining area that had a smoke-free policy. Additionally, 79% of owners/managers expressed interest in some sort of smoke-free policy for outdoor dining areas. As a result of education and awareness, 21 restaurants adopted smoke-free outdoor dining areas. Strategies included: Collaborating with traditional and non-traditional organizations. Providing owners toolkits that included a straightforward policy, enforcement, and education; weatherproof signage, table tents, coasters, and label buttons to promote the policy. Offering to support restaurants with policy recognition events. Conducting public opinion polls and owner/manager interviews. Lessons learned: Difficulty working with and obtaining commitment from corporate restaurants versus independently owned and operated franchises. Consideration of owners/managers time is critical to relationship building and policy implementation. Setting realistic policy goals based on what is possible versus what is prescribed. Recommendation: Continue smoke free advocacy campaigns with restaurants for outdoor dining to become a social norm. Support for policy adoption from the public and restaurant owners/managers must be marketed as a business model and not a public health model.

Gabriela Lemus, Community Worker, San Mateo County Tobacco Prevention Program
Derek Smith, Tobacco Prevention Program Director, San Mateo County Tobacco Prevention Program

Arming Tenants with the Basic Tools Needed to Advocate for MUH Smoke-free Policies

A high percentage of California renters prefer to live in non-smoking complexes free from SHS exposure that can affect their and their families' health. According to statewide polls, 69% of California renters support a law requiring landlords to provide non-smoking apartment units to their tenants. In San Mateo County, less than 11% of the residents smoke, and rentals that offer No Smoking have the largest share of the local market. After the San Mateo County Tobacco Education Coalition prioritized smoke-free housing advocacy as a social norm change goal, the group collected a variety of topical educational materials, developed smoke-free housing advertising, conducted outreach efforts to inform providers, and implemented tenant and landlord smoke-free housing interest surveys. Throughout these efforts, a key message was for anyone to call the Tobacco Prevention Program with questions about managing drifting smoke. As a result of this outreach, the program has received an increased number of SHS complaints and inquiries. Staff have taken the opportunity to educate callers on current policies, demonstrated strategies to mediate smoke-free housing problems, and shared resources to assist the tenants. Staff guide callers through a step-by-step process they can follow to resolve the issue and to encourage their landlord to adopt a voluntary smoke-free policy in their housing complex. Additionally, city officials are learning more about the campaign through resident and county staff correspondence. The Tobacco Prevention Program has developed a variety of tools, including phone call screening forms to standardize information collected from callers; a phone call tracking form that can be utilized to mobilize tenants for future local smoke-free housing concerns; sample letters sent to residents, landlords, smokers, and city staff; website resources on smoke-free housing; a local smoke-free housing fact sheet for landlords; public opinion surveys for tenants and landlords; and other materials to support tenants in advocating for their own smoke-free homes. The program has encountered several best practices related to supporting tenants, including: 1) Developing and communicating a step-by-step advocacy process for tenants to resolve their issue and encouraging tenants to start at the simplest possible solution. 2) Ensuring that correspondence directed to tenants is also cc'd to elected officials and city manager in their community to ensure these leaders are aware of the issue. 3) Tracking calls closely to be able to mobilize callers for future smoke-free

Jeff Wolsfeld, Project Director, Del Norte County
Doug Plack, Chief of Police, Crescent City

The Right Turn to Opening the Door to Smoke-Free Multi-Unit Housing

Taking on the tasks of proposing a no smoking policy in apartment complexes in Crescent City appeared more daunting then working towards smoke free parks, fairgrounds, and even lowering youth access to tobacco. The reason: We would be dealing with non-elected and private citizens who own property and not committed to the community at large. Their bottom line would be keeping apartments occupied in order to make a profit. Add to this a 16% smoking rate in a rural area of California. Based on the Community of Excellence needs assessment, the Del Norte County Tobacco Use Prevention Program

(TUPP) developed an objective to have a minimum of 4 out of 8 multi-unit housing complexes in Del Norte County adopt a voluntary smoke free policy designating 50% of contiguous individual units as smoke free (including balconies and patios). Numerous intervention strategies were included in the objective, to include utilizing local organizations, personal connections, and public events to gather and gauge support. Many lessons were learned during the first year. 1. We learned that there was broad public support for smoke free policies covering multi-unit housing and in protecting the health of children. 2. Connecting with the Crescent City Police Department's Crime Free MUH Program resulted in discovering their program had similar goals such as: a stable, more satisfied tenant base, increased demand for rental units with a reputation for active management, lower maintenance and repair costs, increased property values and improved personal safety for tenants, landlords, and managers. This connection opened the door for TUPP to host a Crime Free/Smoke Free Workshop, which was then followed by a meeting with the district manager and property managers of AWI Management Corporation. 3. Sending Boy Scouts out to distribute anti-smoking information was well received by property managers and in turn built confidence and self-esteem in the Scouts. 4. Property managers were well aware of the dangers of smoking and second hand smoke, along with the damage caused by smoking in the individual units. 5. There was initial concern surrounding how the no smoking policy would be enforced, but after discussion it was clear that the policy would be enforced like any other policy. 6. Bringing in an outside expert who had experience in renting apartments brought the information down to a property manager level and was well received.

Track 3: Demonstrating Program Performance and Effectiveness

Nsele Nsuangani, Health Educator-Project Director, Kern County Public Health Services Department-Environmental Health Division Tobacco Education Program

Tobacco Retailer's Permit Program Implementation and Penal Code 308 (a) Enforcement: Working Together to Reduce Illegal Sales of Tobacco Products to Minors- Kern County Study

The Kern County Tobacco Retailer's Permit Policy adopted by the Board of Supervisors on October 31, 2006 followed by the cities of Wasco, Tehachapi, McFarland, and California City in early 2007 and fully implemented in July 1, 2007 has tremendously impacted and changed the way Penal Code 308 (a) enforcement activities are conducted in Kern County areas legislated with or without a tobacco retailer's permit policy. Each year, Kern County Tobacco Education Program work with various law enforcement agencies around the county and conduct what is famously known as The Kern County Youth Tobacco Purchasing Survey Project. The countywide survey involved the Kern County Sheriff's Office for the unincorporated areas, the local police department of the incorporated cities, and student volunteers recruited from various high schools in the county. Strategic planning, organizing, and human networking are fundamental to conduct a project, year after year, in the fifth largest county in term of population in the state of California. We will share with the audience the steps we have been taking to keep doing it year after year, breaking all kind of political barriers, and still making the difference. During the compliance check, clerks are cited on the spot for selling tobacco products to minors and will have to appear to a judge who will decide on his or her fate. If the area is legislated by the County Tobacco Retailer's Permit policy, the owner of the facility is notified at a later date about the violation and the

administrative penalties he or she will be responsible for. Holding an administrative hearing where all owners of facilities cited in violation of the county tobacco retailer's permit policy come to hear their fate require a strategic planning and human organization. We will share with the audience how Kern County has been able to hold an effective and informative administrative hearing with business owners over the years. We have collected a wealth of data since the policies have been in place and analyzing data to determine if there is significant evidence linking the reduction of illegal sales rate of tobacco products to minors in the county with these policies will be the highlight of the presentation.

Jeanette Treiber, Project Director, Tobacco Control Evaluation Center

Applying Cultural Competence to Program Planning, Implementation, and Evaluation

Tobacco Control programs and other social and health prevention programs are asked to apply cultural competency to their work. But what does that mean and how does it apply to the work we do on our prop 99 funded projects? The Tobacco Control Evaluation Center has long been working on helping projects apply cultural competency to evaluation by developing tools that help to conduct evaluation with different cultural groups. Projects have also stepped up and built in cultural competency objectives, for instance by addressing cultural diversity and priority populations. To prevent this important work from becoming add-ons to the other work we do and make it an integrated and ever present part of tobacco control, this presentation will show how cultural competency recommendations made by the Center for Cultural Competence and the American Evaluation Association apply to tobacco control work. The goal of this presentation is to create a sense of need, urgency, and capacity for doing all our work in a culturally competent manner. Examples will be shown from the planning, the implementation, and the evaluation. Projects will see how cultural competence is relevant in plan writing (choosing objectives, thinking about intervention activities, planning evaluation activities), during the execution of the program (recruiting and working with diverse coalition members, working in diverse situations and with diverse populations, striving for inclusiveness, using appropriate language, etc.), and while conducting evaluation activities (culturally appropriate and inclusive data collection, analysis considerations, etc.). The presentation will also point projects to useful resources that can help them become culturally competent organizations. The overarching goal is to make the audience aware that cultural competence is not a skill needed for certain situations or objectives as is sometimes assumed, but that it needs to permeate throughout every objective and everyday work.

Mark Weber, Chief Epidemiologist, Los Angeles County Department Of Public Health, Tobacco Control & Prevention Program

Advancing Tobacco Control Policies at the Municipal Level: A Framework for Local Health Departments and Community Action

BACKGROUND Tobacco control policies play a vital role in local efforts to reduce tobacco use. The Los Angeles County Tobacco Control and Prevention Program (TCPP) embarked on a comprehensive restructuring in 2004 to improve its capacity for local policy adoption. METHODS TCPP improved its capacity for adopting and implementing local tobacco control policies. Key elements of TCPP's restructuring framework included: 1) creating a fully-staffed and trained Policy and Planning Unit; 2)

partnering with state-funded tobacco control organizations to provide high quality training and ongoing technical assistance; 3) implementing a highly structured policy adoption approach; 4) expanding the capacity of CBOs to plan and implement tobacco control policy campaigns; 5) establishing local coalitions to mobilize communities; 6) establishing fiscal incentives for the funded CBOs to conduct the activities of the Policy Adoption and Implementation Model (PAIM); 7) increasing TCPP's funding to expand the reach and impact of tobacco control efforts; and 8) promoting the visibility and recognition of TCPP. RESULTS Based on the coordinated efforts of TCPP and its community partners, a total of 79 local tobacco control policies were adopted in 43 cities and in the unincorporated area of Los Angeles County from 2004 to 2010; 18 additional policies were passed but did not receive assistance from TCPP. The adopted policies covered 77% of the county's 10.4 million population and included the following ordinances: 29 tobacco retail licensing, 18 smoke-free parks, 11 smoke-free beaches, 7 comprehensive smoke-free outdoor areas, 5 smoke-free outdoor dining, 5 smoke-free multi-unit housing, and 4 others. In comparison, only 15 smoke-free ordinances were adopted from 1998-2003. This represents a 427% increase in policy adoption from 1998-2003 (15 policies) to 2004-2010 (79 policies). DISCUSSION Although the county experienced a dramatic increase in tobacco control policy adoption in the six years following TCPP restructuring, the lack of a rigorous research design precludes making strong causal inferences about the effects of program restructuring. However, the 427% increase in policy adoption was achieved in spite of 58% and 43% decreases in TCPP funding and CTCP media funding targeting Los Angeles County, respectively, during 2004-2010, as compared to 1998-2003. The recent experience in Los Angeles County suggests that this readiness can be developed relatively quickly, but requires a highly structured process, strong community partnerships, and a robust technical assistance and capacity building infrastructure.

Track 4: Emerging Tobacco Control Issues and Innovative Approaches

Lisa Archibald, Policy Manager, American Lung Association In California
Ofelia Alvarado, Policy Director, American Lung Association in California
Debra Kelley, Senior Director of Advocacy and Health Initiatives, American Lung Association in California

Exposing Big Tobacco: What You Don't See

Home to nine universities, two law schools, eight colleges and two military bases, San Diego is a prime destination for 18-24 year olds. The area's vibrant night life attracts a diverse group of young adults, as well as the tobacco companies who seek to prey on them. Historical data from the State Attorney General revealed that the tobacco industry typically sponsored over 300 events in bars each year in the San Diego area, with more than 95% taking place in the city of San Diego. The American Lung Association in California's Tobacco Free Communities project will be working with the city of San Diego to pass a legislated policy prohibiting the distribution of free or low-cost tobacco and nicotine products, coupons, coupon offers, gift certificates, gift cards, rebate offers or other similar offers for tobacco and nicotine products. But first we must collect persuasive qualitative and quantitative data, and train young adult to be effective advocates, in order to make a compelling case for policymakers. Today, only Philip Morris reports its bar promotions to the Attorney General, making it seem there are far fewer tobacco

events than in the past. However, through conducting key informant interviews with young adults and bar owners, holding a focus group with young adult smokers/bar-goers, and training young adults to make bar observations, we learned the shocking truth: Big Tobacco, especially RJ Reynolds, is everywhere young adults are. One focus group participant revealed that she goes to a bar near San Diego State University every Thursday night because she knows the RJ Reynolds representative will be there, and she can get low-cost cigarettes. Another participant who used to be a doorman said the tobacco reps would give him, and the bartenders, free cigarettes each week, sometimes introducing exotic new brands that were hard to resist. All participants agreed that encountering tobacco representatives in bars made it more difficult to quit, and easier to start smoking. Armed with this knowledge and determined to defeat Big Tobacco, we turned for help to a new, non-traditional partner, the Art Institute of California, San Diego. Twenty-three talented young adult students in the Advertising and Persuasive Marketing Class took on the challenge of developing a comprehensive campaign to recruit young adults for the project. The top three campaigns will be presented as examples of cutting edge strategies to engage young adults**.**

DeAnne Blankenship, Program Manager, California Health Collaborative
Shelly Brantley, Program Manager, American Lung Association of CA

Advancing Community Tobacco Control Policies through Non-profit and School Partnerships

Tobacco Use Prevention Education (TUPE) funds are now awarded through a competitive process for grades six through twelve. Only school districts with expertise in anti-tobacco advocacy are able to compete, and many under-achieving schools do not have staff to write a competitive proposal. Consequently, many schools in low socioeconomic communities no longer provide tobacco education at these grades. Collaboration with community-based anti-tobacco programs is required of TUPE-funded programs however our experience has been one of the opposite; severely limiting the abilities of LLAs and Competitive Grantees to have a sustained impact on multiple levels of the community. To address this gap, the American Lung Association (ALA) and the California Health Collaborative (CHC) offered to help Chico Unified School District's (CUSD) newly hired Safe and Drug Free Schools Coordinator write a TUPE proposal featuring student advocacy efforts entwined in their newly awarded TCP competitive grants. As a result of what Coordinator Brodsky reported was evidence of strong collaboration with community partners, CUSD was awarded TUPE funds to implement KLEAN; an anti-tobacco advocacy campaign for 8th grade students from all three junior high schools. To incorporate student participation, the ALA's smoke-free parks and CHC's smoke-free entryways campaigns were combined into a single comprehensive secondhand smoke policy campaign. The TUPE grant is responsible for Counselor and student recruitment, materials for student trainings, and student coordination. ALA and CHC provide trainings, technical assistance, and advocacy activity materials (Ex: observation forms, butt pick up materials, etc). ALA and CHC staff design and implement the trainings together for a unified campaign. In its first year, KLEAN completed presentations culminating in endorsements from the School Board, PTOs and District PTA, and the Chico Area Recreation District (CARD) Board; tabled at community events gathering hundreds of signatures of support; conducted entryway and butt litter surveys; and wrote letters to the editor which also resulted in editorials and articles in numerous area papers. As a result of our collaboration to date: 1.CARD passed a smoke-free parks policy covering all Chico neighborhood

parks. 2.CUSD was awarded another TUPE grant to fund a KLEAN High School component with last year's KLEAN students mentoring incoming 8th graders. 3.KLEAN presented a comprehensive secondhand smoke policy request to the city's Internal Affairs Committee. Members directed staff to gather more information in support of the policy going forward.

Bob Gordon, Project Director, LGBT Partnership

Is the Time Right for a Tobacco-free Pharmacy Ordinance in Your Community?

On August 7, 2008, San Francisco became the first city in the United States to pass a local ordinance which eliminated sales of tobacco in pharmacies. The Department of Health, City Attorney, Mayor's office, University and community-based organizations all worked in collaboration to make this happen. Richmond, California and fifteen communities in Massachusetts have also adopted policies. Interest in the issue is beginning to grow. The main justification for San Francisco's policy was that a pharmacy is a place of health and as a licensed health care facility, a pharmacy should be a place you go to get better, not to get cancer. Tobacco-free pharmacy policies are a newly-developing area of tobacco control, and this is an excellent time to learn what steps can be taken to prepare for a future policy in your community or county. Steps could include creating a database of all pharmacies in your community, making visits to pharmacies to make observations, collecting letters of support from professional organizations and from pharmacies that are already tobacco-free. There is also an opportunity to create community education activities, purchase or earn media, and engage in other policy activities before and during a policy effort. In any case, it is vital to gauge your political support before going forward. The United States stands virtually alone in the world in allowing tobacco sales in pharmacy settings. With the advent of several tobacco-free policies now in force, there is opportunity for other communities to move forward.

Alyonik Hrushow, Tobacco Free Project Director, San Francisco Department of Public Health

Using Tobacco Retail Licensing to Restrict the Sale of Tobacco Products in Pharmacies: the San Francisco Experience

Background: On August 7, 2008, San Francisco became the first US city to pass a local ordinance eliminating tobacco sales in pharmacies. Previous campaigns focused on education, raising awareness, voluntary policies, and shareholder resolutions to stop tobacco sales in drugstores. Methods: The existing tobacco permit ordinance was amended to eliminate tobacco sales from businesses where pharmacy services were rendered. Contributing factors to the successful adoption of the ordinance and survival of legal challenges included strong leadership from the Director of Health and Mayor's Office, community education and organizing by the LGBT Tobacco Education Partnership, public support, technical assistance from the Tobacco Free Project, and the City Attorney's legal expertise. In crafting the language of the ordinance, it was key to focus on regulating the conduct of the sale of tobacco. Arguments and data to support such a regulation were clearly articulated and supported by the ordinance findings. Results: Initially the ordinance eliminated tobacco permits for establishments with pharmacies, while grocery and big box stores were exempted. San Francisco won a legal challenge from Philip Morris, which claimed the ordinance was regulating tobacco advertising. While the City did not

prevail in the lawsuit filed by Walgreens, claiming their equal protection rights were violated by the exemption for grocery and big box stores, the larger public health goal of changing social norms about tobacco availability was achieved when the ordinance was further revised to remove the exemption for grocery and big box stores. The ordinance further survived a legal challenge by Safeway, which claimed that (1) Safeway had a constitutional right to sell tobacco products and (2) that only the California Pharmacy Board could regulate what products can be sold in pharmacies. San Francisco argued that (1) it was exercising its local police powers to protect the public health and welfare and that (2) the state Pharmacy Board regulates the pharmacy profession and that law allows local government to regulate how tobacco products are distributed and sold. The lawsuit was dismissed by the court in July 2011, and Safeway did not file an appeal. With all 3 legal challenges resolved, the legal uncertainties that may have prevented other local jurisdictions from pursuing similar policies have been removed and paved the way for others to follow suit.

Janet Hunt, Director of Alternative Education, Mono County Office of Education
Nancy Mahannah, Health Promotion Division Manager, Mono County Health Dept.
Trish Schlichting, TUPE Coordinator, Mono County Office of Education

MOODLING with Middle School: Using Technology to Enhance Engagement

Pressure on the education system created by the enforcement of No Child Left Behind, the turnover of teaching staff due to budget cuts, and the subject specific California Standards have made implementation of prevention curriculum an added burden for the schools. To ameliorate these negative impacts, the LLA and Office of Education developed an intervention to move a youth tobacco prevention curriculum into an online environment. This intervention is currently underway. The purpose of the online curriculum is to provide students with a learning environment with which they are familiar (computers) to advance tobacco education and prevention skills. A second purpose is to create efficiencies by providing teachers a method to effectively implement prevention curriculum without a facilitator from the Office of Education or the LLA and without themselves having advanced health education expertise. A one day teacher training on the use of the online system and use of the curriculum will be conducted in January. The online curriculum will be implemented Winter 2011. Student success will be evaluated by a pre and post test, as well as focus groups with students and teachers to assess the online aspect of the prevention program. Additionally, Mono school districts are 3 of only 10 districts in California that are currently conducting the California Healthy Kids Survey (CHKS) online and are the first to deliver the online CHKS in the elementary schools. The online CHKS has decreased academic class disruption, increased correct completion rates by students, created a 90% savings in supplies, and gained very good acceptance by school administration. The activities included training staff in development of online classrooms, creating the curriculum, collaborating with teachers and the Office of Education to ensure buy-in and access to the online environment for students, evaluating the online implementation, and troubleshooting.

Ian Mclaughlin, Senior Staff Attorney, Public Health Law & Policy (TALC)
Lisa Henriksen, Senior Research Scientist, Stanford Prevention Research Center
Luisa Sicairos, Intern/Student, Youth Leadership Institute

A Date with Density: Reducing the Number and Concentration of Tobacco Retailers

A Date with Density: Reducing the Number and Concentration of Tobacco Retailers Tobacco retailer density, measured either by the number of retailers per population or in a given area, correlates directly with accessibility and availability of tobacco products in a community, and may lead to higher rates of tobacco use. In addition, tobacco retailers are clustered disproportionately in low-income neighborhoods and communities of color, creating disparities in access and exacerbating existing health inequities. Where tobacco is sold, it is also advertised, therefore higher tobacco retailer density increases the visibility of tobacco advertising. Many California communities have mapped tobacco retailers in their city or county to illustrate retailer density and proximity to schools and other youth-oriented areas, but we still lack a thorough understanding of the relationship between density and tobacco use. Also, in recent years several California communities have adopted policies to reduce tobacco retailer density, either through land use policies (zoning, Conditional Use Permit), local licensing laws, or direct regulation. Each approach has advantages and disadvantages, particularly if the community seeks to apply the policy to existing retailers. This proposed panel includes a research and a program component, as well as a community viewpoint. For the research component, Lisa Henriksen of the Stanford Prevention Research Center will summarize the evidence about retailer density and tobacco use, highlighting results from a TRDRP-funded study about adult smoking in California. She will also present the results of the first longitudinal study showing that requiring a local retailer license can reduce retailer density in high school neighborhoods, even in the absence of a specific provision in the ordinance regarding density. For the program component, Catherine Mongeon of Public Health Law & Policy will discuss the policy approaches to reduce density (zoning, CUP, licensing, and direct regulation), and the advantages, disadvantages, and legal/Constitutional issues involved with each approach, including which approach could have the fastest effect in reducing density. Luisa Sicairos with the Youth Leadership Institute's Tobacco Use Reduction Force (TURF) will discuss their program's advocacy and data collection efforts to reduce the density of tobacco retailers in San Francisco, particularly in low-income neighborhoods with a high population of people of color and youth. Ian McLaughlin of Public Health Law & Policy will moderate the panel.

Matthew Moore, Staff Attorney, Public Health Law & Policy: Technical Assistance Legal Center

Nicotine in the Digital Age: Electronic Cigarettes and the Law

Electronic cigarettes, or e-cigarettes, are battery-powered devices designed to mimic conventional cigarettes by providing inhaled doses of nicotine through a vaporized solution. Although it is not entirely clear what health risks are posed by e-cigarettes, the FDA has expressed concern about their safety, as initial studies have revealed the presence of hazardous substances in e-cigarette cartridges. The popularity of e-cigarettes is growing rapidly, and it is becoming increasingly common for e-cigarette users or vapers to use e-cigarettes in places where smoking conventional tobacco products is prohibited,

such as workplaces, restaurants, bars, transit systems, etc. Because e-cigarettes technically produce vapor rather than smoke, they are currently not subject to most existing smokefree places laws. To address this issue, some state and local governments have begun to take steps to close this loophole. In many cases, existing smokefree laws can be made to apply to e-cigarettes by amending the law's definitions of smoke and smoking to include e-cigarettes and e-cigarette vapor. Many states, including California, have also passed laws to regulate how e-cigarettes are sold, for example, laws that prohibit the sale of e-cigarettes to minors. It is important to note that as the popularity of e-cigarettes grows, so too does organized opposition to laws or policies that would regulate them. Local governments and public health advocates who choose to work on the issue of e-cigarettes should therefore be prepared for such opposition.

Julia Shrader-Lauinger, Youth Program Coordinator, California Youth Advocacy Network

TRL and Beyond: Building Capacity for Youth Participation in Retail Campaigns

The passage of strong Tobacco Retail Licensing (TRL) ordinances in over one hundred California jurisdictions and subsequent reductions in tobacco sale rates to minors has illustrated the effectiveness of policy work in retail settings. At the local level, California youth have been instrumental in the research supporting, as well as advocating for the passage of these ordinances, in turn reducing the availability of tobacco in their community. However, over 60% of youth smokers do not buy their tobacco products directly from retailers, despite being over-represented as customers of convenience stores and gas stations. Many get their products from social sources, such as friends and family, which is much more difficult to measure, monitor, or control. Regulatory alternatives, such as retailer density restrictions, display restrictions, and rules regarding alternative products in the retail arena could have a significant impact in youth exposure to tobacco advertising and reduce the influence of advertising in formulating youth desire to begin tobacco use. In this way, retail locations still have an impact on youth tobacco use, regardless of the method of the products' acquisition. CYAN has strong and approachable insights to engage youth in local retail campaigns. This statewide focus on youth opportunities and involvement is transferable to local campaigns.